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Iron and Steel in Great Britain.

THE following papers were read at a recent meeting of the Iron and Steel Institute, held at Merthyr. The Duke of Devonshire presided, and the sessions occupied two days:

PUMPING AND WINDING MACHINERY.

The author, in this short paper, gave a description of pumping and winding machinery at a pit belonging to Mr. R. T. CRAWSHAY, named the Castle Pit, and situated near to Merthyr Tydfil. The piston of the pumping engine is connected with the pump rod, so as to work direct. The beam is placed below the cylinder, and the motion is regulated by means of a crank and fly-wheel. The pump rods are raised by the piston, but they perform the down stroke by their own weight, which is considerably more than the water load, the excess of weight being balanced as much as necessary by making the crank end of the beam much heavier than the pump end, and by using a heavy connecting rod. The stroke at the pump end is 8 feet, but at the crank the stroke is 13 feet 4 inches, which gives the crank end considerable leverage and helps to balance. The pit was sunk in a stone quarry, and it was necessary to raise the top of it up to the level of a railway by building masonry, so the beam was placed below the cylinder to make this masonry also form the engine house. The nozzle is furnished with a steam-valve and discharge valve, opening into and out of the bottom of the cylinder. They are worked by two separate eccentrics, so that the steam-valve can be made to cut off the steam at any part of the stroke required. The nozzle is arranged to admit the waste steam to the top of the cylinder during the down stroke, to keep it hot. There are two valves, in addition to the working valves, moved by screw handles, to shut off the supply of steam and to regulate the discharge. All these valves are "double beats." The diameter of the piston is 68 inches, and the pressure of steam in the boilers is 40 pounds per square inch. The rim of the fly-wheel is 26 feet diameter over, and weighs 37 tons. The pit is 333 yards deep to the bottom of the sump, but the pumps only raise the water 279 yards, where there is an adit. There are four lifts, and all the pumps are forcers, with plungers 15 inches diameter, but the lower forcer has an extra valve-box and working barrel, 14 inches diameter, fixed upon it, so that, in case of accident, a bucket can be put to work in the lower column, thus turning it into a temporary lifting pump. The valves used in these pumps are common lifting valves, made of gun metal. The pump rods are wrought-iron bolts 18 feet long, each rod having a socket at the end to receive the next rod below it, and they are fastened together by cotters passing through them in the usual way. The diameter of the rod at the top is 6¾ inches, but the section is lessened as the tension decreases till the bottom rod is only 4½ inches. As it is necessary to place the plungers close to the main pump rod, to make the set-off as short as possible, there is no room for cisterns, so the water is delivered from one pump to the next by means of lodge rooms formed in the side of the pit. The shape of the pit is oval, 22 feet 8 inches long by 12 feet wide, with a brattice dividing the winding parts from the pumps. A space is left vacant between the brattice and pumps, large enough to repair or change any part of the pump work without interfering with the winding. The guides used for the cages are rails, in 18 feet lengths, fastened by means of chairs to oak stumples every 9 feet. The winding engine has cylinders 36 inches diameter, and 4 feet 6 inches stroke, worked by steam at 45 pounds per square inch. The piston rods are guided by parallel motions, and the valves are worked by slot links, the valves being "double beats." There are safety valves fixed on the cylinders, to prevent overstraining, and the drums are furnished with a steam brake. The drums, 12 feet diameter at the centre piece, and 16 feet 6 inches over the rim, and flat ropes are used. The cages are made double, to lift two trams at once, each tram of coal weighing 31 cwt., long weight.

A vote of thanks was accorded to Mr. PEARCE for his paper.

Mr. COWPER offered some observations in reference to the working of steam for pumping, winding, and blowing engines. In practice, they commonly found it the case that gentlemen did not care for a large amount of expansion in one cylinder, on account of the irregularity of motion. He had endeavored to expand steam eleven times in one cylinder, but he found it most unsatisfactory, because it inevitably induced great irregularity of motion. In practice, this expansion in one cylinder was not used except in the Cornish engines, where there were no parts to jar—no fly-wheel or crank. The speaker then, at great length, proceeded to enter into details, but it would be useless to follow these in the absence of the elaborate plans by which they were illustrated. He took two cylinders, and cut off the steam at half stroke in the high-pressure cylinder. The steam then passed into the reservoir, where it was kept warm and taken care of until the cranks had moved ninety degrees, the steam then passed into the low-pressure cylinder. So that there were two figures—one high-pressure and one low-pressure, and the expansion was from half stroke. He had not followed the truly theoretical curve of the steam. But when the steam came out of the high-pressure cylinder they had a portion of isolated steam warmed up, which was an easy method to obtain a greater degree of economy than the true theoretical curve. As to the results, he might state that they had had three pumping engines, and more were being made. They had also one marine engine for her Majesty's ship "Briton," which was 2146 horse-power; and steaming at her fullest steam, at the measured mile, she made thirteen and a quarter knots with 1.98 pounds of coal per horse-power per hour. When working easier, at ten knots an hour speed, she burnt 1.3 pounds of coal per horse-power per hour. If the proof of the pudding was in the eating, these engines certainly worked with more economy than most engines. But it was a satisfactory solution to find that they had a fair engine with one cylinder on each crank, and the cranks at right-angles.

THE CONDITION OF CARBON AND SILICON IN IRON AND STEEL.

A lengthy paper on this subject was read by Mr. G. J. SNELLUS, of Dowlais, of which we now give the following abstract, reserving for our next issue its publication *in extenso*:

After adverting to the well-known fact that these elements combine with iron, in some form or other, and that they exercise a marvellous influence upon its nature, according to the proportions and state in which they exist, Mr. SNELLUS pointed out the discordant opinions held by distinguished metallurgists as to the nature of this union of carbon and silicon with iron, and stated that the object of the investigation, the details of which were given in this paper, was to try to obtain some insight into the conditions under which carbon and silicon exist in iron, by applying what were believed to be original methods of research, which, in contradistinction to the ordinary chemical analysis, may be termed "mechanical isolation." Our most eminent metallurgist, Dr. PERCY, has stated, when speaking of the two conditions in which carbon can exist in pig iron, namely, as graphite and combined carbon, that though the graphite is more or less free carbon, "yet not a trace of graphite can be detached (from the surface of pig iron) by the point of a penknike," but by selecting pieces of largely crystallized pig iron, as exhibited at the meeting, it was shown that the graphite could be removed from the faces of the crystals by the finger-nail, and even from ordinary Bessemer pig in the same way. Some graphite removed in this way was examined and proved to be pure carbon. Since, then, graphite existed in mechanical combination in pig iron, mechanical means ought to enable the analyst to separate it from the iron in quantity. Two methods of mechanical separation were followed, first, by sifting the borings of pig iron through a very fine sieve; second, by stirring up the fine borings in distilled water, and pouring off the lightest portions for analysis. The causes which lead to high carbon in pig were next alluded to, and it was stated that the carbon reaches its maximum when the blast is hottest, slag most basic, ores least silicious and harden light. He expressed his belief that there is no definite chemical compound of iron and carbon, but that the absorption of carbon by iron is a case of chemical solution, and he supported this statement by reference to the phenomenon of solution in general. With regard to silicon, Mr. SNELLUS said some metallurgists believed that this element exists in iron in two different conditions like carbon. A fine specimen of silicon in the crystallized condition, together with some other chemical rarities kindly lent for the occasion by Messrs. HOPKIN & WILLIAMS, of Cavendish street, London, was exhibited, and Mr. SNELLUS pointed out that if it were a fact that this substance existed in iron in the free state, the same methods which isolated carbon should also more or less isolate silicon. He pointed out that silicon in quantity rendered pig iron difficult to puddle, and occasioned a great loss of yield; that in the Bessemer process it was necessary to have about two per cent. in English pig iron, because they never contain more than five per cent. carbon, and little manganese; and as a certain amount of fuel must be burnt during the blow, to make the metal hot enough for casting, we must either have silicon in addition to the carbon and manganese, or burn iron. The former expedient gives the best results; and, moreover, it is not easy to keep the silicon below two per cent. in grey Bessemer pig iron. The effect of silicon upon iron and steel is to render it hard and brittle, and in all probability the reason why FAIRBAIRN and others have found pig iron to increase in strength by several successive meltings, is that by these fusions more or less of the silicon is removed. While melting, however, the iron gradually takes up sulphur and phosphorus from the fuel, and in the end the deterioration due to these substances more than counterbalances the increased strength caused by reduction of the silicon. Steel which contains more than one-tenth per cent. of silicon is brittle, and though it is a rare thing for Bessemer steel to be faulty from this cause, it may sometimes occur, thus proving, along with the analysis of Bessemer metal taken during the blow, (the results of which are recorded by the author) that in the Bessemer process the silicon is not removed before the carbon, as in the puddling and refinery processes, but along with it. The reasons why good wrought-iron may sometimes contain quantities of silicon that would be fatal to steel were then considered, and the existence of considerable amounts of sulphur and phosphorus, under like circumstances, were believed in the same way to arise from the fact that they existed more or less in the interposed slag, and not combined with iron. In case, he pointed out that the results of complete analysis of the several mechanical products to which he had referred lead to the supposition that there is some difference between the sulphur and phosphorus in pig iron, since the former can be more or less separated, like graphite, and the latter remains with the metallic iron-like silicon.

The noble Chairman then said they would all be rejoiced to accord the thanks of the meeting to Mr. SNELLUS for his valuable paper. (Applause.)

Mr. LOWTHIAN BELL, after referring to the papers just read, as strong proof of the sagacity of the decision of the Council to circulate printed copies of the papers read before being discussed, expressed coincidence in the view that Dr. PERCY had made a mistake in asserting that a grain of graphite could not be taken on the point of a penknife. With regard to the very important object alluded to by Mr. SNELLUS, namely, to introduce the suggestion—the offer of which he was glad to see was so promptly received—that they should have a chemical laboratory in connection with the Institute, he apprehended that there would be more difficulty in carrying that out than Mr. SNELLUS anticipated. If he gladly heard the applause with which the suggestion was made, it was because he inferred from it that the iron-makers of this kingdom were willing to ask for that assistance which science could alone afford, rather than from a sanguine belief that a laboratory, in connection with an institute like theirs, could be carried into practical effect. Mr. SNELLUS had referred to some of his (the speaker's) own labors in connection with the deposit of carbon. Now he had guarded himself sufficiently, he hoped, from the suspicion that he made any positive assertion that at low temperature, or while iron was in a partially reduced state, carbon had absolutely entered into combination with the iron. All he had pretended to point out was, that the carbon was a deposit by decomposition or dissociation of carbonic oxide into the interstices of the iron ore. And that it was this, (almost irrespective of the reduction of the ore itself) he had had abundant opportunities, since he made his first communication to the Institute, of proving. He did not mean to say that a certain amount of reduction in the first instance was not required, but that it depended in the result on the quantity of carbon deposited; of that he was certain. Within the last week he precipitated on iron three hundred per cent.; that was three times the weight of carbon upon iron actually into the ore, while there was only three per cent. of oxygen in the ore removed. Indeed he had found this—with the lesser removal of oxygen—great deposition of carbon. All he wished to show was, that the dissociation of carbonic oxide took place at a low temperature. No apology was needed from Mr. SNELLUS for bringing the matter forward. Much the same observation was applicable to silica, and in his own experience he had had the opportunity of observing something that bore on Mr. SNELLUS' paper. Mr. SNELLUS told them: "The balance of evidence, then, appears to favor the theory that silicon is dissolved, or (to borrow a word which perhaps more nearly impresses the state of combination) 'occluded' in the iron in the same way as the carbon, but that the solvent power of the metal is so much greater for silicon than for carbon that it is quite a rare thing, even if it ever occurs, for silicon ever to separate in a free state from the iron." He could not remember the exact analysis, but he remarked again, that in pig iron hot from the blast furnace, in particular kinds of ore, as iron ore, they had found it rich in silica. That there had been a coating in some instances of a quarter of an inch of a deposit of fibrous silica, in such fine divisions and under such circumstances, he could not doubt. It might have proceeded from occluded silicon of pig iron being forced out during the process of cooling the pig iron, and as it came in contact with the air becoming oxidized and being converted into silica. The fact was, that a quantity of silica was formed under the conditions just mentioned. That it was a rare occurrence he was willing to admit; for in twenty-five years' experience in the manufacture of pig iron, he did not remember noticing the circumstance more than three or four times. With regard to silicon delaying the process of puddling, that he believed was an established fact. Indeed, under some circumstances, where the silicon amounted to something

like seven per cent. of the weight of iron, it seemed almost impossible either to puddle or refine it. He remembered receiving from Scotland a quantity of iron—glazed pig iron—and neither in the refining blast, nor in the heat of the puddling furnace, could they reduce it to iron. It was only by adding the infinitesimal pieces of other iron that they could get rid of it.

MR. BESSEMER wished to make a remark on the presence of silicon in steel. A very general opinion prevailed in the trade, (and it was correct when they spoke of large quantities,) that silicon was deleterious to the make of iron. It was the impression that they should get rid of silicon, and they would then make better iron. That was not the case, in proof of which assertion he called attention to the old steel process, as carried on in Sheffield, and adduced instances to show that the presence of silicon improved the quality of the manufacture. He had not had an analysis of the best quality of Sheffield steel that did not contain silicon.

Mr. SNELLUS said he wished to make one or two remarks, in answer to Mr. BELL, with regard to his observation on the deposition of carbon in the ore. During the process of reduction he had made a few experiments in that direction ; and he thought the deposition of carbon in the ore during the process of reduction was due more to the action of fine particles upon the gas at high temperature. For this reason : He had taken pure sand—although he had in this case taken coal gas—and the conditions were rather different from those of Mr. BESSEMER. But he had taken fine angular particles of sand, and heated them in a tube through which he passed coal gas, and on the angular particles carbon was deposited, which was not deposited on the porcelain tubes in a combined substance. So that he thought the deposition of carbon in the ore was due to other than the chemical manner of reducing the iron. He found, as Mr. BELL had said, that reduced ore combined more or less of carbonaceous matter, but it was not in a state of chemical combination. For instance, if they attempted to dissolve reduced iron, and he had perfectly reduced some in that condition, they did not get the color. Many of them were familiar with the "brown test"—that the remaining carbon was not soluble. EGERT's process showed that the carbon in reduced iron rusted from some other condition than that it was not soluble. It was left as free carbon, and not combined carbon. He had not a word to say as to Mr. BESSEMER's remarks, except as to his own experience, that he had never found an instance, as stated in the paper, where the finest qualities of iron and steel were perfectly free from silicon. There was an example in their own Bessemer steel, which contained 00.9 per cent., and which, in fact, were so small that they were scarcely able to estimate it. But they did estimate it, and there was actually that quantity, and he had never found a case in which, in dissolving iron or steel in a large quantity, they did not see silicon. With respect to the separation of free silica from iron, the instance given by Mr. BELL showed that his were most exceptional circumstances. He was not sure that it was separated from the pig iron as silica ; or whether the form in which Mr. BELL found it was not due to other causes. It was well known that free silica was found in blast furnaces frequently ; and that was pointed to as a proof that it existed in the pig iron in a free state. But he did not see the connection, because he thought silica might be found in a free state in blast furnaces, without going into the the composition of the pig iron.—*Colliery Guardian.*

The Transmission of Power.

From the Report of Dr. F. A. P. BARNARD, U. S. Commissioner to the Paris Exposition.

HITHERTO, in most cases in which a transmission of power to a distance has been attempted by mechanical means, the losses necessarily incurrred have been enormous. Indeed, beyond a certain quite moderate distance, the fraction of the whole force available at the point of application becomes too small to compensate the expense and trouble of the operation, and the undertaking is left unattempted. In the great water-engine at Huelgoat, the transmission of the power is as direct as possible, and is reduced to the last degree of simplicity, and yet so cumbrous are the connections that a force of fifty horse-power is consumed in merely giving motion to the machine without any load. A similar example, but on a comparatively small scale, may be seen at Niagara Falls, near the suspension bridge, In this place there is a gorge through which the waters of the river are forced with an abundance of wasted power sufficient to turn all the machinery in the world. But this power is expending itself between two precipitous cliffs three hundred feet deep. No fraction of it can be turned to use without being first lifted perpendicularly upward through this great interval. For the most part, therefore, it has been allowed to run to waste.

An attempt has been made, nevertheless, to draw from it the the insignificant amount of power necessary to drive a saw-mill on the brink of the precipice, and for this purpose a water wheel has been established at the river's edge, and connected with the saw-mill by means of several long iron rods. These rods are jointed that they may follow the irregularities of the face of the precipice, and receive the support and guidance of stays attached to the rock. The object to be accomplished in this case is small, and the power is abundant so that a little more or less of waste is a matter of no consequence ; but this renders the example more striking, since the power required to move the apparatus of transmission cannot be less than that which is needed to drive the mill.

The great charge upon the prime mover which these cumbrous modes of transmission entail, restricts within narrow bounds the extent to which they can be employed. A discovery which shall greatly enlarge these limits cannot but prove to be an inestimable benefit to the world. By bringing into use, and employing to give activity to industry, forces which must otherwise be wholly and permanently unavailable, such an invention is practically a creation of force.

HIRN'S TELODYNAMIC CABLE.

An invention of this kind is presented in the present Exposition, originating with Mr. C. F. HIRN, of Logelbach, on the Rhine. It rests upon a very simple principle, the substitution of velocity of motion for mass of matter moved. No truth is more familiar than that a given force may be equally represented by a heavy body moving slowly, or a light one moving rapidly. With a smart blow from a light hammer we may easily crush a pebble, while a gentle blow from a very heavy one may produce no effect. In the machine called the wheel and axle a small weight acting on the wheel may raise a large one suspended from the axle through a given space in a given time ; but a still smaller one at the wheel will do the same work, provided the size of the wheel be sufficiently enlarged and the velocity of its circumference correspondingly increased.

In the attempts which have hitherto been made to transmit power to distances, it has been the ordinary working velocity of the prime mover which has been transferred from the source to the point of application. In this form we have seen that force is not advantageously transmissible. It was a simple idea, but one truly ingenious, and fertile of admirable results, to transform this power into a shape in which, while it should not be directly applicable to the uses for which it is required, it should, nevertheless, possess the property which it did not possess before, of transportability.

It is this transformation which is the essential part of Mr. HIRN's invention. The motor is made to give a high velocity to a pulley wheel, and this wheel is employed to carry a cable which passes over another pulley at the point where the power is to be applied to use. The cable may be light in proportion as the velocity with which it travels is greater. Theoretically, there is no limit to the extent to which this transformation may be carried. A hair or a spider web, if it move fast enough, may convey the force of a thousand horses. Grant that the velocity may be made equal to that of light, and a quantity of matter in the cable wholly inappreciable to the senses will suffice for the same purpose. But there is a practical limit to the velocity with which a pulley can be run, and the cable must have strength to overcome the inertia of the pulleys and the passive resistances of friction on the pivots and of the air. Happily, the object in view may be sufficiently attained without transcending the limits here indicated.

The invention thus described, when first presented to the mind, seems easy enough of application. Great difficulties were, nevertheless, encountered by the inventor in reducing it to practice. The cable, though light, requires, when the distance is considerable, to be supported at intermediate points. For this purpose smaller pulleys are introduced at intervals of about one hundred and fifty metres. The cable itself is of wire, about one centimetre in diameter, the extreme pulleys four metres, and the intermediate ones half as large. The great pulleys are driven with a velocity of from one hundred to one hundred and fifty revolutions per minute, or from fifty to seventy-five miles an hour at their circumferences. The smaller must, of course, make twice as many revolutions. In the earlier experiments the wear of the material was found with this rapidity of motion to be enormous. Continual failure was the consequence. One after another different kinds of wood and different metals were successively tried in the construction of the pulleys. But though their surfaces were made as smooth as possible they rapidly destroyed the cable. They were then covered with leather, with India rubber, and with other yielding materials, but the cable destroyed these coatings still more rapidly. The substance which was found at last to answer the purpose, and to present a surface, which, without being worn itself, should not wear the cable, was gutta-percha. This is driven compactly into a groove enlarged at the bottom in order to secure it firmly to the wheel, and it has been found so durable that, after a period of seven years' use, it still remains sensibly unaltered. The series of experiments which resulted finally in this success extended from 1852 to 1860. In estimating the credit due to the inventor, this perseverance, under discouragements so numerous and protracted, will not be regarded as the least of his merits.

The receiving pulley must run, of course, with the same velocity as the transmitting pulley, and as this last has attained its excessive speed of rotation by means of a train of accelerating wheels, connected by bands or gear work, so at the point of application the velocity must be reduced again by a corresponding train retarding.

In the arrangement of the pulleys of the intermediate or supporting stations, the wheels are made as light as consistent with strength, not only for the sake of reducing the inertia of the moving mass and the friction on the axes to a minimum, but for the more important object of diminishing the resistance of the air. It can hardly be doubted that an abandonment of spokes entirely, and making the pulley a plane disk, would improve essentially the performance, could disks be made at once strong enough to fulfil the required function, and light enough not materially to increase the friction. It will be seen further on that the resistance of the air, which Mr. HIRN admits to be equal to the sum of the other resistances, is in fact more than double all the rest put together.

Respecting the form of the groove into which the armament of gutta-percha is compacted, a word may be said. The dovetail enlargement of this groove at the base is necessary, not merely to secure the gutta-percha against displacement by ordinary causes, but to prevent its being detached by centrifugal force. Mr. HIRN assumes thirty metres per second (98.5 feet), to be the velocity which it is expedient ordinarily to give to the circumference of the wheel ; but he has carried this occasionally as high as forty metres (131.2 feet). At thirty metres the centrifugal force generated at the circumference of the smaller pulleys, of two metres in diameter, will be between ninety and one hundred times the force of gravity ; and it will be nearly one hundred and seventy times gravity. That is to say, as the circumference of such a wheel measures a little over twenty feet round, if each foot of this circumference weighs one pound, the whole will be dragged in all directions with this last velocity by forces which unitedly will amount to nearly a ton and three quarters. It is on this account that Mr. HIRN suggests that the limit of thirty metres had better not be overpassed, higher velocities endangering the destruction of the wheel.

The invention of Mr. HIRN was first applied in the transmission of moderate powers to moderate distances. Instead of a cable there was used in the beginning a band of steel, having a breadth of about two and one-half inches, and a thickness of one twenty-fifth of an inch. This presented two inconveniences. In the first place, on account of its considerable surface, it was liable to be agitated by the winds ; and secondly, it soon became worn and injured at the points where it was riveted. It served, however, very well for eighteen months to transmit a twelve horse-power to a distance of eighty metres (266 feet). A cable was then substituted, and this, first introduced in 1852, is still in good condition.

It was in the attempt to extend the system to greater distances that the difficulties above spoken of began to be encountered. At the distance of eighty metres no intermediate supports were necessary. At the distance of two hundred and forty, to which the system was next extended, such supports were found to be indispensable in order to prevent the cable from dragging on the ground. It was only when after the many trials and failures above mentioned, a material had at length been discovered which rendered these supports indefinitely durable, that this second experiment could finally be pronounced completely successful. After this success, however, the extension of the system went on rapidly. A single firm, Messrs. STEIN & Co., of Mulhouse, have applied it in more than four hundred instances with entire success. These applications have been made for the most part in France, and in the department in which the invention originated, but there are some noticeable exceptions. The government manufactory of powder at Okhta, in Russia, has introduced it for the transmission of the force of its turbines over a distance of one thousand four hundred metres. Several establishments in Germany employ it for distances varying from three hundred and fifty to one thousand two hundred metres. An officer of the Danish navy has made one application of it on a line of one thousand metres ; and at the mines of Falun, in Sweden, a more than one hundred horse-power is transmitted by it to a distance of five thousand metres.

The invariable success of all the applications hitherto made over distances constantly increasing, has satisfied the inventor that power can be economically carried by this method as far as to ten or fifteen miles. The experience thus far acquired has furnished data by which the loss attendant on transmission can be very closely calculated. This loss, which will, of course, increase with the distance, may be referred to three sources—namely, the friction on the axles of the pulleys, the rigidity of the cable, and the resistance of the air. Experimentally, it is found that, for the two great pulleys at the termini, an allowance must be made of two and one-half per cent., and for the intermediate pulleys and the rigidity of the cable, there must be allowed additionally one per cent. for each thousand metres. Thus, for one hundred horse-power carried to a distance of ten kilometres, or six miles, the loss will be $2\frac{1}{2} + 10 = 12\frac{1}{2}$ horse-power, or one-eighth of the whole ; the resistance of the air being still to be added. Mr. HIRN makes allowance for this by doubling the last sum ; so that one hundred horse-power may, in his opinion, with perfect certainty be carried six miles without losing more than twenty-five per cent. It will be shown below that this is an under-estimate.

The cost of the machinery and its erection is estimated at 5,000 francs per kilometre, exclusive of the necessary constructions at the termini, which will require an additional expenditure of twenty-five francs per horse-power. In the case of one hundred horse-power carried ten kilometres, the total expense will therefore amount to 52,500 francs, or a little over $10,000.

That this mode of transmitting power will soon come into extensive use, can hardly be doubted. There are parts of our country in which it cannot fail to be of immense value. The mineral States, in the heart of the continent, are imperfectly supplied with water-power at the points where it is most to be desired. They are still more imperfectly supplied with fuel. To them it will be an inappreciable benefit to be able to turn to account the force of the mountain streams, which are now running to waste, but which, by means of this invention, may not only be made available, but made repeatedly available, by damming them at different levels. For its practical value, this invention, simple as it appears, is one of the most important that has presented itself in the Exposition ; and the jury have shown that they so regard it, by awarding to the inventor the distinction of a grand prize.

Mr. HIRN has presented some calculations designed to illustrate the economical advantages which the telodynamic cable possesses over a rigid shaft, or arbor, as a means of transmitting force. He proposes, for instance, the problem, what weight of arbor, and what power of prime mover, would be necessary in order to deliver a force of one hundred horse-power at the distance of twenty kilometres, say two and a half miles? In the solution of this question, he has considered the weight of the arbor and the force which would be necessarily consumed in overcoming the friction of its supports ; and he concludes at last that the horse-power required in the prime mover would amount to the enormous total of 788,400.

On the other hand, supposing that the prime mover is of the force of two hundred horse-power, and that it is required to

know what is the extreme distance at which this motor can deliver a force of one hundred, he finds that this maximum distance would be only 1,545 metres, or less than a mile, (a mile 1,608 metres.)

The comparison between the two modes of transmission leaves, of course, no place at all to the second. But a comparison so presented is a tacit assumption that in the practical solution of this important mechanical problem there is no other choice but between the two modes of transmission contrasted. Whether or not this assumption is wholly legitimate, we shall presently inquire. A different solution of the problem is in fact presented in the Exposition itself, and this will now be considered.

CALLES'S HYDRO-AERO-DYNAMIC WHEEL.

Another mode of transmitting power to great distances, proposed by an exposant from Belgium, Mr. A. CALLES, deserves consideration, if not for what it is, at least for what it suggests. The plan of Mr. CALLES is to make use of air under a certain degree of compression as the vehicle of the force to be transmitted, not by accumulating the air thus employed in reservoirs, but by driving it, by the operation of the original motor, directly into a tube extending to the point of final application, where it is to be discharged beneath a wheel submerged in water, which it is to turn by its ascensional force.

The idea of employing compressed air as a means of transmitting power is not new; but the mode here suggested, of using the power so transmitted, is sufficiently original. The exhibitor claims originality in another point of view. His application of the power is not only original in form, but in principle also. At Mount Cenis, where air is employed as a vehicle of force, it is the elasticity of the compressed air which furnishes the motive-power. Consequently, it is there important that the compression should be carried very far. It is carried, in fact, up to six atmospheres. The present apparatus proposes to derive its mechanical advantage not from elasticity, but from volume. It is, therefore, here equally important that there should be as little compression as is compatible with the attainment of the object.

The air being employed to turn a submerged wheel, it will be easily understood that the wheel must have the form of an ordinary over-shot water-wheel reversed. In the over-shot wheel, it is the weight of water which is in the buckets of the descending side, while those of the ascending side are empty, which causes the wheel to turn. The motive-power is the difference between the counteracting weights of the two sides. In the submerged wheel driven by air, on the contrary, it is the weight of water which is displaced from the buckets of the ascending side, while those of the descending side are full, which is the measure of the driving power. In the present case, as in the former, this driving power is the difference between the weights of the two sides.

It is assumed by the inventor that air immerged in water ascends to the surface with a velocity of one metre per second. In point of fact, the rapidity of ascent of air in water will depend very much upon the volume ascending, and will be, on an average, materially greater than is here stated. But assuming the statement to be correct, it would furnish a limit to the velocity which can be given to the circumference of the wheel; and a given wheel will perform its maximum of work when the supply of air is sufficient to keep its ascending buckets full at half this velocity. Considering, however, that the motive power in the case is gravity, the most advantageous velocity must be necessarily not greatly different from that which experience has shown to be best with the ordinary over-shot wheel working in the air—that is to say, must not exceed one metre per second at the circumference.

The compression of the air must evidently be sufficient to overcome the pressure of the water at the point of efflux beneath the wheel. This point may be taken at three or four metres of depth, and the corresponding pressure will amount to three or four-tenths of an atmosphere. As the air ascends, it resumes by degrees the bulk which belonged to it before compression. In order to take advantage of this circumstance, the velocity of discharge must be so adjusted to that of the wheel that the buckets may not be entirely filled at the bottom. Otherwise there will be an overflow from the rising buckets, and to that extent a loss of motive power.

The inventor takes no account of the resistance of tubes to the flow of air through them. He supposes that at low pressures and low velocities this resistance will be insensible, so that the power received from the source may be almost wholly re-established by the wheel. He has erected a wheel in the park of the Exposition, which is designed to demonstrate the truth of this proposition, and to illustrate his system generally. It is driven by air compressed by an engine in the palace, and transmitted by a tube nine and a half centimeters, (3¾ inches) in diameter, and one hundred and fifty-seven metres (more than 500 feet) in length. This tube makes in its course fourteen right angles, in order to avoid the constructions which it encounters on its way. It is computed that a force of nine and a half horse-power is expended in compressing the air, and that the velocity of efflux is thirty-two metres (more than 100 feet) per second. On the other hand, the power of the wheel turned by the escaping air is stated at nine horse-power. From these figures it would result that the loss in the present instance is but about five per cent. That there is a fallacy in the calculation is evident from the consideration that the loss of a submerged wheel, driven in this way by air, cannot be less than that of an ordinary over-shot water-wheel of the same dimensions; and that this loss is at least one-fifth, and is often more than one-third. And it results from the experiments of the Italian engineers at Coscia, on the resistance of tubes to columns of air driven through them, that to maintain such a velocity as is stated to be given to the air in this experiment, and to the distance named, of one hundred and fifty-seven metres, there would be required an expenditure of force without return, sufficient to produce a compression of nearly an atmosphere and a half.

[TO BE CONTINUED.]

A View of the Oldest Rocks in the Light of Recent Geology.

THE first of the stratified rocks, comprehending a series of immense extent, attaining a magnificent development in Canada and along the shores of Lakes Huron and Superior, have very much of interest clustering about them. They are the earliest born of the sedimentary formations; the offspring from the prime products of the slow cooling of a globe of molten matter, and the founders, themselves, of a long line of water-produced rocks. They mark the beginning and the considerable lapse of a period in the earth's history when forces and agencies, similar at least in kind, to those now active, commenced their ravages on the oldest rocky masses—the granites and their congeners. They are the witnesses to the time when water began to erode, and carbonic acid to decompose the highly-crystalline products of a refrigeration of matters which had doubtless been at first vaporized, and had slowly passed through the liquid state to such solids, giving rise to the first land around which the waves of the primeval ocean lashed and beat, and upon which the rains from an acid-charged atmosphere descended. They are the starting points alike of geological facts and geological theories—the firm ground upon which the geologist gathers himself for his great leap forward into the mysteries of the earth's history, and upon which the cosmogonist plants himself to dream and theorize upon the origin of the globe and of the system of which it is a member.

So much there is about these earliest stratified rocks which is of interest to pure science. Their study and examination are of no less importance to the student of applied or economic geology. In their bosom are entombed those vast masses or beds of iron compounds which have become the objects of systematic and extensive operations in Canada, Michigan, northeastern New York, Missouri and Sweden. Associated with them are valuable occurrences of copper and lead-bearing minerals. In them have been stored some of the most wonderful beds of mineral phosphate of lime, which are even now exacting attention from manufacturers who are converting their contents into a valued adjunct to practical agriculture, which will restore fertility to hundreds of worn-out acres and cheapen the bread of toiling thousands. Scattered throughout them are deposits of graphitic carbon which, though as yet of minor importance, will eventually find industrial employment and application, and minister, under some guise, to civilization and comfort.

This series of rocks was long described in our works on geological science, under the term azoic. It consists of beds of stratified granite, or rather gneiss, with layers of compact and close-grained quartz rock, hard, sonorous clay and magnesian slates, and granular marbles and limestones, the whole succession having the magnificent thickness, in Canada, of more than seven miles. Nearly forty thousand feet of chemical and mechanical sediments deposited on the floor of the primeval sea, expressing the wear of the primitive granites, and being the unmeasured and immeasurable exponent of chemical and physical activities and agencies, as well as the record of the grandest and longest of the days of geologic time! A grand series of leaves—in fact, a huge volume of the story-book of nature are these rocks, which we are just beginning correctly to read, thanks to the interpretation—the result of years of study—of the geologists of the Canadian survey.

The scientists who so admirably executed that great work saw reasons to subdivide this immense series of rocks, and in accordance with the somewhat-to-be deprecated custom of geologists, gave to these subdivisions local names, derived from those sections of the country in which their most marked developments were noticed. To the lower and oldest of these the name of Laurentian was given, while upon the upper and more recent was bestowed the title of Huronian. These names have become generally adopted, and now designate the respective members of the series wherever found, the term azioc, as applied to them, having passed, for good and sufficient reasons, to the still more ancient granites and other fire-born rocks—the first and original products of the passage of the elements of the globe from the liquid to the solid condition.

Unquestionably there was a period in the earth's history when its conditions were unsuited to the presence of life, whether animal or vegetable. But these conditions were not those of the time of the deposition of the Laurentian and Huronian rocks. The waters had * "been gathered together" around the bare granitic land-masses, and were gnawing away and carrying the products of their destruction for deposition elsewhere. The atmosphere was approximating in composition to what it now is, and the temperature of earth, air and water could not have been vastly greater than now obtaining. Such an existing order, though it was doubtless unfavorable to the existence of higher animal and vegetable forms, was not one that would preclude the existence of humbler and lower beings. The hot springs of California and the Geysers of Iceland offer conditions which were formerly and universally regarded to be unadapted to animal and vegetable life; and yet we now know that neither the circumstances of temperature and of chemical affinities and surroundings of these springs are unfavorable to life, since organized beings find their habitat therein. We may safely at least admit the possibility of the occurrence of some humbler shape of life during the lapse of the period when the members of the Laurentian and Huronian series were forming in the bed of the primeval ocean.

But we are only thus far in the region of the possible. How stand the probabilities of the case? For these we can gather some considerable light from the chemical compositions of the rocks themselves, and from the nature of some of their associated minerals and ores. These were the data from which that bold and original chemist and geoloist, Dr. T. STERRY HUNT, as early as 1858, reasoned out the conclusion that the Laurentian rocks had been formed when life was present in the waters of the globe. In May of that year he published a paper, in which the presence of iron ores and of graphite was brought forward as affording evidence of the "existence of organic life during the Laurentian or azoic period." Whence came this carbon so abundantly distributed through certain members this series in the form of graphite, if not originally from carbonic acid through the agency of vegetation? How came those vast deposits of metallic sulphides, if not through the reducing action of organic matter on the corresponding sulphates, whereby the oxygen of the acid and of the base were both removed by oxydizing some organic carbon, sulphurets of iron, of copper, of lead, and of zinc being precipitated, and either disseminated throughout the rocks then forming, or concentrated in fissures as veins? What chemist can stand upon and study the modes of occurrence of the iron deposits of Lake Superior, of the Adirondacks, and of Missouri, without admitting that organized matters were concerned in their formation?

It seems almost trivial to ask such questions now, and yet no one thought of putting them till HUNT had collected his data, and from them drew the legitimate conclusion that the age of the Laurentian rocks could not be the real azoic period of the globe's history. Geologists were slow to admit his conclusions and to adopt his views, since they were unsupported by any direct and positive evidence, such as was offered by the other sedimentary rocks by their contained fossil remains. It was true that all traces of these might have been obliterated from the Laurentian rocks by the chemical changes which they had undergone subsequent to their formation; but so long as no remains of animal or vegetable life were disentombed from them, it was deemed much safer to reject than to adopt the beautiful conclusions of HUNT, and to still regard the Laurentian and Huronian rocks as the monuments of a true azoic age.

But these wonderful deductions of the chemist soon found positive confirmation by the discevery among the Laurentian rocks of the Ottawa river, of obscure traces of organic remains, which in August of 1859, Sir WILLIAM LOGAN, the chief of the Canada survey, exhibited to the Association of American Geologists, etc., assembled at Springfield. In 1864 additional specimens were discovered throughout Canada and in the Connemara marble of Ireland, which, on microscopical examination,* were shown to be organic in their structure and affinities, and the term azoic was then shifted further back into geological history, and the new one of *eozoic* introduced for the age of the Laurentian and Huronian rocks.

What was the nature of this oldest inhabitant of the globe—for the specimens collected were all of one genus. Great differences of opinion have been held with regard to these specimens from the serpentinous limestones of Canada and elsewhere, and a stoutly-contested battle has been waged between those in favor of the organic origin and those who deny this. The first—and they are the most numerous, have the best of evidence, and are mainly observers well acquainted with the structure of shelled protozoa—claim that it is really a fossil which, under the microscope, gives good proof of a foraminiferal structure, whilst the others, probably closing their mental eyes, see nothing with their physical organs of sight but inorganic flocculi, globules and fibres. The first have won the battle after a stout contest, so that few geologists now hesitate to admit its organic origin, and to modify their views of the condition of the globe at the time of the formation of the Laurentian rocks in accordance with this discovery, which Sir CHARLES LYELL characterizes as the greatest in geology of his time.

Having its nature established, the fossil received the imposing cognomen of the *Eozöon Canadense*. It belonged to the very lowest of animal forms, being a member of the group of Protozoa. "It was related to the nummulites, whose skeletons have contributed so largely to the material of the Pyramids—monuments which perpetuate the memory equally of the nummulites and the Egyptian monarchs. It was related, also, to the little disc-like forms called *Orbitoides*, so abundant in the white limestones of the southern portion of the Gulf States. Indeed, the kindred of this primeval forerunner of animal forms have been permitted to maintain an existence in all seas and in all ages down to the present day. The type came upon the earth when nothing could dispute its pre-eminence. It has claimed a place among the ranks of higher animals in the ascending series, and does not shrink even from the face of man. Nay, the type maintains a foothold in the stagnant pools that gather upon the surface of the land, where man asserts peculiar supremacy. It demands our reverence for its antiquity."†

Animal life, though of the lowest of forms, was therefore present in the wide-extending ocean of the Laurentian period. It has left its impress on the rocks of Canada as well as on those of Ireland and Bohemia. What a triumph this discovery was to the mind that reasoned out its probability, and to those who gave the deductions of that mind countenance and support! The key to the origin of the vast iron-ore and other mineral deposits of the Laurentian rocks is within our grasp, and faithfully unlocks all that was hidden and dark about their mode of production and formation. It was equal to the end to be accomplished; for do not these minute forms of animal life hint at and indicate the existence of vegetable life? Is not vegetation the supporter of the animal kingdom, preparing its food by direct assimilation from inorganic matter?

Though no traces of vegetable forms have as yet been noticed in any members of the eozoic rocks, the minerals these contain may be fairly assumed as representing the existence of plant life; for the products of such were, without doubt, con-

* Made chiefly by Dr. DAWSON, of Montreal, and entirely corroborated by the eminent Dr. CARPENTER, of London.

† "Sketches of Creation," by Professor A. WINCHELL.

cerned in the production, and were destroyed by oxydation in the chemical changes of which such minerals are the results. And again, these Laurentian and Huronian rocks have been highly metamorphosed, and the chemical changes involved in this metamorphosis have, it may be, obliterated all traces of vegetable forms. Because fossil vegetation has not been discovered, it must not be inferred that the living forms did not exist. There are too many probabilities to the contrary for such a view to be seriously entertained.

The greatest development of these formations, as before stated, is in Canada. From the coast of Labrador they extend southwesterly to the north shore of Lake Huron, whence, bending around towards the northwest, they are continued on to the Arctic ocean. Isolated patches —islands in a sea of more modern rocks—which have escaped the erosive action of water, are found in Eastern New York and in southeastern Missouri, in both of which localities they contain extensive beds of magnetic and other iron ores. A third member of the series, intermediate in age with the Laurentian beneath and the Huronian above, and resting uncomfortably on the former, is believed by the members of the Canadian survey to exist. Of them all the lower members, or the Laurentian, are emphatically and markedly the mineral-bearing rocks, and indicate the great and true iron age of the world. They were deposited and precipitated at a time when the ocean was charged with soluble iron compounds, which were most probably changed by the action of other dissolved salts into a carbonate, and as such settled down upon some of the already formed and still submerged members of the series, to be further changed, by the loss of carbonic acid and the absorption of more oxygen, into the chemical condition in which they now exist. These iron deposits really constitute strata, and are as much a part of the Laurentian formation as are the gneisses limestones and slates with which they are intercalated, or with which they are associated.

The Huronian series marks the close of the great eozoic period, and was the sloping, shelving shore upon which were laid the first of the members of the silurian period—the Potsdam sandstone—which was long regarded as the oldest of the fossiliferous rocks, and which, with its associated traps on Lake Superior, is the seat of those wonderful occurrences of native copper which so long puzzled and confounded mining experts. They are not so highly metalliferous in character as the lowest members of the eozoic period, especially in the Lake Superior region, though they still carry deposits of sulphuretted ores of copper, lead and zinc, and are also, to some slight extent, silver-bearing. With their deposition and elevation closes the dawn of animal life ; the next change in the great geologic day is to the early morning with its new marine animals and plants—the paleozoic age.—*American Exchange and Review.*

MINING SUMMARY.

Nevada.

THE REVIVAL AT SILVER BEND.

THIS district, which received so large a share of attention a couple of years ago, and was afterwards almost deserted, is, according to the *Reveille*, reviving rapidly, and, before the expiration of another year, will be one of the most important in the State. "There are now," says that paper, "at the Manhattan mill in Austin seventy-five tons of Eldorado ore, which will yield an average of $200 per ton, besides two tons of selected ore, which it is estimated will yield $1,000 per ton. This ore comes from a great vein, eight or nine feet wide. The entire mass of this vein might be utilized and rendered productive by the aid of a cheap and efficient process for reduction. One of the Transylvania is next in importance, by reason of its development and production, as well as by the fact that it is to be aided hereafter by a mill furnished with the Stetefeldt furnace. This mill is to be of the capacity of fifteen tons daily, and will be completed within sixty days. While these works are in course of construction the exploration in the mine will be carried on with vigor. The Arizona is also producing ore; and several other mines in the neighborhood are yielding lots of rich chloride ore."

THE COPE MILLS.

The Elko *Independent* has the following intelligence: "The Norton mill at Cope is rapidly approaching completion. The site selected is on the east bank of the Owyhee, opposite Placerville. It will be completed within a month. The machinery for a new mill (DAVIS & Co.) has arrived at Mountain City, and will be erected immediately. Mr. DAVIS will put up his quartz mill as fast as possible. DREW & Co.'s mill, at Mountain City, after being idle for a few days for repairs, is now at work on Ida Gossage ore, which is certain to return big results. WHITNEY & Co. have shipped an engine and boiler to JACKSON & Co., Eureka."

AFFAIRS AT WHITE PINE.

The *News*, of Sept. 4th, speaks as follows with reference to mining prospects in White Pine: "Mining affairs for the past week have been more healthy than at any time since the organization of the district—legitimate operations only now being undertaken, in lieu of former speculative schemes, tolerated in times of excitement and the chaotic state of primitive settlement. True, there are not as many miners at work underground now as we would like to see, nor the amount of ore raised which the supply warrants; but the way is quietly preparing in this district for future extensive operations hitherto unknown in the history of our State. Many of the best claims of the district have passed into the hands of wealthy companies, and these are consummating plans for a basis insuring permanency and undoubted success. First requisite needed is: absolute titles to mines from Government against all floating claims springing up under vague and imperfect mining laws; then labor at rates within the limits of profits derived; next, the most approved modern methods of reduction admitting the profitable conversion of all classes of ores—high and low grades—into bullion."

From the same source we condense the following items of mining news: "The MATTESON furnaces are sure to be a success. The portion of the machinery ordered from the East will soon be on the ground. Seven mills are now running, and a 40-stamper will soon be in course of construction. The bullion shipment for the past week has been $50,401 38.

"The Ward Beecher is working thirty men and taking out from thirty to forty tons ore daily, which nets $40 a ton. Friday, ore was struck which resembles the rich ore of the Eberhardt, and large pieces were taken that were nearly pure silver. In Silver Wave, the ore from shaft No. 4 is paying $80 a ton. Last working of Hidden Treasure ore gave $74 per ton. Schoharie turns out six tons daily of ore that looks worth $40 per ton. Matilda ledge on the surface is eighteen feet wide—assays from bottom of shaft, where it is four feet wide, $80. BOWIE & BROWN, Blue Hill, has forty tons on dump, assays from which show $250 per ton. Eberhardt has only four men employed, merely to keep things in order. Silver Wedge will increase its force next week. Aurora South has an immense quantity of ore exposed. Of the Base metal mines.—Trench is taking out very rich ore. The furnace will fire up this month. JONES and partner, near the Trench, in a mine belonging to Col. T. W. ROBINSON, are taking out ore, some of which is worth $1,000 per ton. Gloucester has forty tons first-class ore on dump."

PIOCHE BULLION.—A Hamilton telegram of Sept. 5th says: "W. F. & Co. shipped fourteen bars bullion to-day from the Meadow Valley mine."

EUREKA.—The *Sentinel*, Sept. 3rd, says: "Col. ROBBINS has purchased the Fairview, which bids fair to be one of the big mines. The mill of CARPENTER & Co., at Sierra, will soon be running. FRED. ELLIOTT, of Reno, has purchased the Emerald dump, and is sacking it. It will average $300 per ton. The DUNNE furnace and separating works are progressing. A rich discovery, made within the last thirty days on a hill west of Eureka, shows ore up to $789 per ton. Several other strikes are noted."

THE COMSTOCK.

We have no very sensational items of mining development to report this week. The most gratifying to stockholders are the dividends declared on the Hale & Norcross and the Chollar-Potosi, both of which mines are looking and yielding splendidly. The San Francisco *Alta* says: "The stock market remains very dull. The public have for a long time taken little interest in its operations. The mines do not, for the present, yield the same quantities and qualities of ores as formerly, and the expense of operating has not declined in proportion to the ore grade. The continued calls for assessments have discouraged holders. The mines are not, however, hopelessly det riorated. There have before been seasons of limited production and expensive exploration which have been succeeded by great success, and there are no sound reasons for supposing that there is less wealth in the Comstock lode than formerly, notwithstanding what has been taken out." The following items relative to the mining situations are from the Gold Hill *News*, Sept. 10:

GOULD & CURRY.

"Daily yield from 100 to 110 tons, principally from the new and rich body of ore recently developed in the Potosi section, at the D street level, near the Savage south line. From this body from two to ten tons of sack ore, yielding from $500 to $2,000 per ton are daily taken out, which is shipped to the Auburn mill, near Reno, for treatment. The Old United States section contributes quite essentially to the daily yield, and a few tons also come from other parts of the mine. Nothing new developed in the prospect drifts of the seventh or lowest level. A vast amount of work is done in this mine, and done, too, to the very best advantage, with the least possible expense. It is well managed. The principal feature of interest at present, however, is the late ore development of which we speak, near the Savage line. It was found only some four weeks ago, in running a prospecting drift south in the Potosi section, and was first cut within about fifteen feet of the Savage line. It is a streak or cross seam of ore, from twenty-five to thirty feet thick, running east and west sixty feet across the ledge, and dipping at an angle of about twenty-three degrees from the horizontal toward the Savage mine. A winze follows the foot wall up about ninety feet, and from there a perpendicular raise goes upward twenty feet into the ore streak itself. From this point to the surface is about one hundred feet, and the streak probably extends to the surface, there having been no prospecting above it to prove to the contrary. From the track floor where it was first cut the ore has been stoped out to the height of five floors the full size of the streak, including its length of sixty feet. A surprising amount of work has been done there in a very short time, and in the most workmanlike manner. The timbering is especially substantial and good. The ore at the fifth floor is much richer than that below, showing native silver and free gold quite frequently among soft black sulphuret and chloride ore; indeed, the bullion shows about one-third gold. Owing to a proper attention to winze and drift connections, the mine is well ventilated and comfortable to work in. There is evidently ore enough yet remaining untouched in this body to last for some months yet, judging from present appearances, and although it may perhaps never afford dividends, yet it will prevent assessments, which is pretty good now-a-days."

YELLOW JACKET.

"The extensive ore section at the 800 and 900-foot levels still continues to yield about 200 tons per day of very good ore. This great deposit seems almost inexhaustible, and from the present appearance of the various ore-breasts it will hold out for a long time yet. The drift north at the 1,000-foot level is still being driven energetically ahead, but it lacks nearly 100 feet yet of reaching that winze from the level above. A cross-cut is now being made East in order to prospect the vein in that direction. There has been a report quite current that the mine is about to be shut down in order to put in new hoisting machinery, but we are assured that such is not the case. There is no intention of doing this under two or three months, at least, when the 1,000-foot level is properly prospected, and the deeper sinking of the main shaft found necessary. It will only take a week, even then, to make the necessary alterations and improvements in the hoisting machinery."

IMPERIAL-EMPIRE.

"The new shaft is now down 1,290 feet, being the deepest perpendicular shaft in the State. The deeper sinking progresses favorably, what little water there is to contend with being easily kept down by bailing, and not interfering much, if any, with the work of sinking. This is a very satisfactory idea, in view of the fact that the bottom of the shaft is 200 feet in the regular ledge matter itself, and owing to its much greater depth than any other shaft in Gold Hill, it has to do all the drainage. About the 1st of next month the shaft will have attained sufficient depth to allow of a new station being opened. This will be the 1,300-foot station or level, being that depth from the surface or top of the shaft. The bottom of the shaft is perfectly ventilated by means of the natural current of air induced by a tight partition between the compartments, so that the patent blower is never used or needed. The mine at the 1,200-foot level and above, throughout, is also kept perfectly well ventilated by means of winze and other connections, including good drafts or currents of air, so that there is no difficulty in working with as perfect comfort in any part of the mine as can be done at the surface. Nothing new to report in the way of ore developments. The old upper mine of the Imperial company still yields about forty tons of low-grade ore daily, averaging $12 to $15 per ton, which materially assists in paying the expenses of prospecting and sinking the new shaft. It is estimated that there is enough of this low-grade ore in sight to last a couple of years."

SAVAGE.

"Yielding about forty tons per day of fair grade ore, all from the eighth or lowest level. Nothing particularly new or interesting to report at that point. The drift north, which we have heretofore mentioned as being run to strike the ore body recently developed by the Gould & Curry Company at their south line, on the D street level, reached its destination about one o'clock last night, a small hole being made into the Gould & Curry workings in advance of the main drift. The track floor of this drift is only about a foot higher than that of the Gould & Curry intersection, and a fine draft of air is afforded, ventilating both mines excellently. The Savage drift cut into the ore streak, fifteen feet from the line, but until cross-cutting or sinking is done, the true value of that portion of the streak will not of course be ascertained. It looks promising, however. The main Savage shaft is now down over 1,200 feet, and the ninth station will be opened next week, corresponding to the Hale & Norcross seventh level, 1,282 feet from the surface or top of the shaft. The 'bears' appear to have got after the stock somewhat of late, but there is a prospect of a reaction."

OPHIR.

"Considerable very good ore is being taken from the new streak developed recently in the north Ophir ground, a short distance north of the Mexican north line, to which we referred fully and circumstantially in our last report. Most of it is rich in the precious bullion, yet contain quite a detrimental amount of base metal. It, however, is found better as worked deeper and further south. Nothing new developed at the lowest level, from the new shaft. An assessment of $3 per share was levied yesterday.

HALE & NORCROSS.

"Looking and yielding about the same as at our last report. The north winze below the seventh level, 160 feet north of the shaft, is now down twenty-five feet in first-flate ore, and the raise at the same level forty feet south of the shaft is nearly up to the sixth level, also in first-class ore all the way. The main shaft is now forty-two feet below the seventh level, and sinking deeper at a favorable rate. A dividend of $5 per share is disbursed to-day.

CROWN POINT.

Daily yield about forty tons of fair grade ore from the upper levels. The drift south at the 1,100-foot level is now in twenty-five feet, the face showing only barren quartz and prophyry as yet. The incline is thirty-eight feet below the 1,100-foot level and progressing deeper at a favorable rate, the bottom being in hard prophyry and quartz, with very little water."

BELCHER.

An assessment of $2 per share was levied on the 6th instant, amounting to $20,800, delinquent October 14th. The usual amount of prospecting is being conducted at the 730 and 152-foot levels. The work of opening the 420-foot levels progress well, and promises to develop a good body of ore eventually."

CHOLLAR-POTOSI.

"A dividend of $2.50 per share was declared on the 6th, and is payable to-day. The last one was $2 per share, and those previous to it, $1. The Belvidere and other ore sections are looking fully as well as at our last report, and yielding about the same."

OVERMAN.

"Some very rich ore is taken from the fine and extensive new development in the south portion of 400-foot level but it seems to lie in detached bunches. The ore body continues looking better as further developed, especially as raised upon."

SACRAMENTO AND MEREDITH.

"The upper workings of the extensive ledge still continue yielding excellently, showing some degree of improvement during the last few days, consequently better returns from the mill which runs steadily and well all the time."

VIRGINIA AND CONSOLIDATION.

"Water still interferes with progress somewhat at the 500-foot level drift from the new shaft, yet it has been driven ahead a few feet this week. A few tons a day of good ore continues to be yielded from the old upper mine."

CALEDONIA.

"A fine new body of superior ore was stuck last Tuesday in the south portion of the 200-foot level, which is already yielding handsomely, and bids fair to prove a valuable and extensive acquisition."

SIERRA NENADA.

"Both mine and mill being run satisfactorily and well, consequently yielding very good returns, as the ore pays very well."

OCCIDENTAL.

"The new mill still running most satisfactorily on good ore from the lower mine. No new developments."

HOPE.

"Daily yield forty-three tons, averaging $24 per ton, keeping both mills of the company steadily running."

Utah.

THE VALUE AND EXTENT OF THE MINES.

The Omaha *Herald* of August 27th, has this glowing account of the extent and character of some lately discovered silver mines in Utah: "We were shown a letter yesterday from W. A. ANGELL, to his brother in this city, written from Bingham Cañon, Utah. He is largely interested in several companies that own ledges of argentiferous galena in this and other cañons, from twenty-five to thirty miles southwardly from Salt Lake City. Mr. ANGELL writes that they are very busy putting up an engine and erecting a furnace and crusher of an improved pattern, and they will, without doubt, have the furnace completed within two weeks. A firm two miles down the cañon from there has just got a furnace in operation, and is a perfect success. They ran out in two days five thousand pounds of base bullion, composed mostly of lead and silver, and worth, in Salt Lake, $800 per ton. They harnessed up eight span of mules, and carried the bullion through the principal streets of the city, creating much excitement. He says ore in any quantity can be bought for almost nothing; that yielding $400 per ton is held at from $30 to $50 per ton. He gives very glowing accounts of the wonderful mineral wealth of that section, and says there never were such opportunities to make money in any country as there are in Utah. J. W. HAMILTON, a wealthy miner in this section, was in town on Wednesday, and informed A. L. KING that he had out now ready for shipment twelve thousand tons of rich ore, and that he was shipping East and West as fast as he could. He was quite anxious that silver reduction works should be started here, and was of the opinion that the Utah miners would be glad to take stock in the enterprise. P. J. MCNAMARA, who returned from Utah, Thursday, was in the mining country, and informs us, as one instance of the profits of mining there, that the WALKER BROTHERS

not long since, paid $30,000 for one-sixth interest in the Goodman Mine. There is no doubt that unlimited amounts of rich argentiferous galena exists in the Utah cañons; that the ore is easily and cheaply reduced, and is within convenient reach of the Utah Central Railroad. Numerous fortunes are lying around loose in these mountain gorges, and we are glad to see some of our enterprizing citizens reaching out to them."

New Mexico.

NEW DISCOVERIES.—MINERAL WEALTH IN THE BURRO COUNTRY AND THE RIO DOLORES.

SANTA FE, New Mexico, Aug. 23.—The Colorado Cañon, explored last year by Major POWELL, bids fair to be rivalled by other cañons and mountains not heretofore known. Gov. ARNY, the indefatigable special Indian Agent for this Territory, has lately returned from a point north of the Jan Juan country, reporting some of the most marvellous discoveries that have yet been made amid the great Sierra Madre Mountains. He reports that during his tour to reach the Utah Indians at the west of the San Juan river, his party found the Cañon de Chelly. This was explored for more than 20 miles. They report cañons whose walls tower perpendicularly to an altitude of from 1,000 to 2,000 feet, the rock strata being as perfect as if laid by the skilled hands of masons, and entirely symmetrical. Among these cañons were found deserted ruins of ancient Aztec cities, many of which bear the evidences of having been populous, to the extent of many thousands of inhabitants. In one of these cañons, the rocky walls of which rose not less than 2,000 feet from the base, and whose summits on either hand inclined to each other, forming part of an arch, there were found, high up, hewn out of the rocks, the ruins of Aztec towns of great extent, now tenantless, desolate. In each of these rocky eyries there remained in a state of good preservation a house of stone, about 20 feet square, containing one bare and gloomy room, and a single human skeleton. In the centre of the room were the evidences that fire at some time had been used. The only solution of this enigma thus far ventured, is, that these solitary rooms were the altar places of the Aztec fires; that from some cause the people at a remote period were constrained to abandon their homes, but left one faithful sentinel in each instance to keep alive the flame that, according to the Indian traditions of these regions, was to light the way of Montezuma again to his people—their hoped for Messiah and their Eternal King. A close examination of many of the ruins proved that the builder must have been skilled in the manufacture and use of edged tools, masonry, and other mecanical arts. But who these people were, whence they came, or whither they are gone, is now, probably, one of the mysteries to remain eternally unsolved. Some of the ruins are reported to be stone buildings seven and eight stories in height, being reached by ladders planted against the walls. Round-houses, 20 feet in diameter, built in the most substantial manner, of cut-stone, and plastered inside, were also found in excellent preservation. The mineral resources of the interior Rocky Mountain system seem as yet to have become only partly known. The outer rim, as it were, of the gold and silver-bearing region has only been touched. Explorations in a region of whose mineral wealth not the remotest idea has ever been formed, are at this time going on, and will, I have no doubt, within a very short time, astonish the world. Among the sections most prominent at this time are the newly discovered silver mines in the Burro Mountain, near the Arizona line, and others on the Rio Dolores, into both which regions the miners are flocking in unprecedented numbers. Reports well founded inform us that returns of assays from ores taken from the former mines, and made by the most expert assayers, exhibit the most marvellous results, and that they are without doubt among the richest on the continent. They are supposed by well informed persons to be the East mines, of which tradition has handed down the most marvellous tales, and the mines themselves discover unmistakable evidences of having been successfully worked ages ago. Upon the Rio Dolores already no fewer than 300 rich claims have been taken, their names being as diverse as the tastes of those taking them could devise. This mining region is situated in the Navajo and Utah Indian country, and consequently cannot be successfully explored nor the mines worked with safety and facility until these Indians are pacified.

Arizona.

DATE CREEK MINES.

A correspondent of the San Francisco *Bulletin*, writing from Prescott, July 8, gives the following account of these mines: "The military escort which we accompanied was taking Gen. COGGSWELL from Tucson to Prescott, travelled much in the night, and lay over in the day, giving our little party a lively time in journeying and visiting mines. Here the General gave us an extra half day, enabling your correspondent to make two trips to these mines from Camp Date creek. Practically, I can say little of these mines. Excepting on the Mayflower lode, there is scarcely any work done in the district—which is christened Martinez. Some of the finest specimens of gold ore I ever saw are taken from the shaft on this lode, and it is but seven or eight feet deep. Smaller lodes are sunk at different points on the vein, showing good ore, and evidence of a true vein, from two to four feet in width, though, as any miner knows, not absolute proof. There is little indication of silver, and the gold is very fine, and believed to be evenly distributed in the ore. A company had erected an arastra, and were grinding Mayflower ore, the result of which I have not been advised, therefore I know of the result of no working test, and will not go off in any enthusiastic predictions; if warranted, the fact is unknown, but I would not be surprised to learn they might have been made truly. Not above a dozen miners live in the district proper, and none at the mines. Probably a few more are at work, but, with one exception, only working assessments, which are very light—one day on each claim of 200 feet, performed within forty days after record, holds twelve months. This easy condition is almost a necessity, as the Indians are prowling all about, and small parties of two to four are hardly safe. No attacks have yet been made, but that is no sign there won't be any day. I examined the assessment holes on the Last Chance, Queen of Palmyra, Cornucopia and other viens that show well upon the croppings. Croppings cover the hills on all sides, and veins appear to be very numerous. Wood and water are not convenient in abundance. Water for steam mill purposes may be had quite plentiful within two miles; a fine spring is flowing right in the mines. Date and Martinez creeks each afford some water in the dryest times, and they may be reached by wagon roads in length from one to four miles. Wood is not in greater abundance than about the Vulture mill, where mesquite commands $8 per cord. The Vulture Company get all their lumber from Prescott, and these Date Creek mines must be supplied from here also. Martinez district is twenty-five miles nearer Prescott than the Vulture, the former being about sixty-five miles distant. Date creek gold leads appear well; they may prove even better than they appear."

THE STERLING MILL.

Mr. GARRETTSEE, Superintendent of the Sterling Mining Company's mill and mine in Hassayampa district, according to the *Miner* of Sept. 3, has started the Sterling mill, which mill has been idle for a long time for want of water, It is not expected that the present supply will last more than two or three weeks, to run the mill in daytime only. Everything is said to be in the finest order, that the mill works as smoothly as need be, and that the plates shows a good coating of amalgam for fifteen hours' run. No attempt will be made to work the sulphurets at present. The managers are confident that enough free gold can be saved to pay handsomely.

THE EUREKA MILL.

The *Miner* says of the Eureka mill: This mill was delayed in starting on Monday last, from the fact that some miscreant had cut off and carried away several feet of the main belt, a loss which was not discovered until the belt was needed for use. Any wretch who would do such things deserves to be run through a battery and concentrator, and sent to Belzebub to be desulphurized.

Montana.

ELK CREEK.

According to the *Herald*, Sept. 8, Mr. J. A. FEATHERMAN, of Elk Creek, brings favorable reports from that camp. He says that the Mint Flume Company, about two weeks ago, sold an interest in their ground for $1,500, and have just bought it again for $3,000, having discovered a new and rich pay streak. The other flume companies, extending from Yreka up to Reynolds' gulch, are doing well, as are all the side gulches and tributaries. Water is abundant, and the miners generally are rejoicing.

SILVER MINING AT ARGENTA.

A correspondent of the *Gazette* reports that WASH STAPLETON cleaned up, on the 25th ult., from eleven days' run with the Tootle Mining Company's furnace, two hundred and twenty pounds of silver, one hundred pounds of which was cupelled on September 1st. Mr. STAPLETON intends to keep the smelter running steadily.

ANOTHER DITCH NEARLY COMPLETED.

Mr. J. V. STAFFORD, of Canyon Ferry, informs the *Herald* that the Hellgate and Avalanche Mining Company have about completed their ditch. This ditch has a capacity of six hundred inches, is fourteen miles in length, and covers a large area of rich mining ground. The company have been at work on it for more than a year. At present there is only 200 inches of water, but during a great portion of the season, Mr. STAFFORD thinks there will be at least five hundred.

SILVER BULLION.

COLE SAUNDERS, writing from Phillipsburg to Messrs. HADLEY & DURFEE, of Prickly Pear, says: "Since you left I built a small furnace and made a successful run of two days, as long as our fluxes lasted, and cleaned up 650 pounds of silver bullion. This shows me that with lead ore we can run our rock."

ANOTHER "YELLOW BOY," $41,859.

The Helena *Herald*, Sept. 8, has the following: "S. BOHM & Co. yesterday afternoon cast another gold brick weighing twenty-two hundred and eighty-two ounces. The coin value of this huge bar is *Forty-one thousand eight hundred and fifty-nine dollars*, and weighs, avordupoise, one hundred and eighty pounds! These bankers are turning out these bricks every few days, and it has become so frequent that it is looked upon as a common occurrence, a mere matter of fact. During three days in the month of July Messrs. BOHM & Co. purchased and shipped *eighty thousand dollars* in gold bullion. The yield of the precious metal in Montana, during the present year, will exceed that of last by nearly $10,000,000."

Montana.

FROM RADERSBURG.

The *Independent*, Aug. 26, has the following intelligence from Mr. GEORGE, of Radersburg: Messrs. KEATING & BLACKER have their mill in operation, and are realizing about $3,000 per week, clear of all expenses. They are crushing rock from the KEATING lode. They have a fine mill of fifteen stamps. The Sample mill of ten stamps is running upon custom rock. At present it is running upon ore from the Iron Clad, with the most flattering results. The ROBERT LEE and R. E. LEE lodes are showing some fine rock. The arastras on Indian creek are yielding well from Diamond rock. A number of capitalists are now at Radersburg trying to purchase quartz property. The placer mines are paying well, and business of all kinds is very good.

Colorado.

THE Central City *Register* publishes the following table of bullion shipments for the month of August. The exhibit shows a small improvement over the previous month:

GOLD SHIPMENTS FOR AUGUST, 1870.

Thatcher, Stanley & Co.	$53,000
Jerome B. Chaffee & Co.	44,450
R. M. National Bank	43,800
Total currency value	$141,250
Coin value of same	125,000

SILVER SHIPMENT.

Thatcher, Stanley & Co.	$4,600
Coin value.	4,300
Total shipments for the month, coin value	$129,800

Miscellaneous Intelligence.

WE condense the following from the Georgetown *Miner*:

"Mineral of a good quality is being mined from the west shaft of the Bush lode. The Trenton S. M. Co.'s crushing machinery will be ready to run about the middle of the next month. The Burleigh tunnel has reached a distance of 652 feet, and still the work goes on. The German reduction works shipped a day or two since, 1,098,10 ounces of silver bullion, coin value $1,190 81. The nugget weighing nine ounces, taken out of Georgia Gulch, some time since, has found its way to Georgetown. J. M. SMITH & Co. are sluicing out, at Empire, from surface quartz of the Howard lode, Silver Mountain, $15 per day to the hand. The Stewart Silver Reducing Company's new mill is overrun with ore. The tunnel being driven by the Terrible Company has been advanced 212 feet, with about 140 feet to run to penetrate the vein. The Dives lode, on Republican mountain, is yielding some very fine mineral. It is a recent discovery, and is being actively developed. The William B. Astor lode, situated on the summit of Democrat mountain, is being actively worked with good and paying results. The Helmick tunnel has been driven 335 feet, and is in hard ground. The tunnel, however, is going ahead as rapidly as flesh, muscle, and powder can drive it. The Douglas tunnel, a new enterprise, is going ahead rapidly, and has reached a distance of fifty feet. A quantity of Mendota ore is being taken to the Stewart Silver Reducing Company's new mill for treatment. The mine is now yielding largely. Considerable prospecting is being done, at the present time, in this and adjoining districts, and many new discoveries are the result. The Brown Company will not cupel until near the close of the month. The smelting furnace will be run as long as possible. We are informed by RICHARD IRWIN, that the shaft, thirty-five feet deep, on the Chihuahua lode, Colfax Park, Peru District, Summit county, is in good ore. Work on the William Ferry lode, or Republican mountain, was resumed on Monday last. The ore-vein in the bottom of the shaft is improving. The adit of the Cliff [illegible] has reached a distance of 160 feet, with 80 feet to run to reach the shaft. The ore-vein is improving, with indications of soon developing a body of mineral. Seven hundred feet of drifts and adits have been run in the Snowdrift mine, opening up a large amount of stoping ground. Before the close of the month the mine will be producing large quantities of ore. A wagon load of Brown and Terrible ore, for the Denver and St. Louis Fairs, was shipped from this place on Monday last. The Boston Silver Mining Association have shipped, during the week, from their smelting works at St. Johns, Summit county, 6,600 lbs. of lead riches to Georgetown. Work will be immediately resumed on the Federal mine. The heading of the Baltimore tunnel is now 510 feet from the entrance, and within a short distance of their lode. Drifting on the last-lode cut still progresses, and the ore-vein is now changing from the foot to the hanging wall. GROW & CLARK are sorting the second and Third class Terrible ore, left in their hands at the time of the sale of the mine, and have arrangements with the Stewart Silver Reducing Company to reduce the same. The amount is estimated at 2,000 tons. The adit on the Junction lode has been driven 210 feet, with about 40 feet to drive to reach the shaft. The crevice is seven feet in width, with a large gangue intermixed with some little mineral. In the floor of the adit in many places there is a good mineral vein. The adit should have been driven from a lower point to the vein. The Marshall tunnel is now 810 feet, and is being driven without intermission. The bank has two bricks of silver bullion from the Sulky Company's mill, Snake river, being the first produced by those works. No. 1 weighs 703 ounces, 672 fine—coin value $601 87. No. 2 weighs 589 ounces, 708 fine—coin value $539 17. This is but the commencement of what promises to be regular and large shipments. The owners of the Anglo-Saxon mine have let a contract to drive a tunnel, which will cut the vein at a depth of 200 feet. The mine yields ore of remarkable richness.

MISCELLANEA.

The San Francisco Mint.—The deposits at the San Francisco Branch Mint, during the month of August, embraced 135,471 ounces of gold and 29,629 ounces of silver, while the coinage turned out amounted to $2.370,000, of which $2,340,000 was in Double Eagles, $15,000 in Half Eagles, and $15,000 in Quarter Eagles. Gold bars opened at 900 @ 910, receded to 890 @ 900, and advanced at the close to 910 @ 915. In the corresponding month of last year the deposits consisted of 103,938 ounces of gold and 28,182 ounces of silver, while the range for gold bars was 900 @ 860. The gold deposits at the Mint for the first eight months of the year compare as follows: 1867, 529,514 ounces; 1668, 393,081; 1869, 532,686; 1870, 719,211. The amount for the year is largely in excess of the same time in previous years. The silver deposits since January 1st aggregate 209,104 ounces, against 99,661 ounces for the same time last year.

Mining on a Grand Scale.—The company of English capitalists who lately purchased the Eberhardt and several other valuable mining properties in White Pine district, are embarking in the business of mining on a mammoth scale. The Elko *Independent* says of these operations: The lumber for the mill and buildings, now in town awaiting shipment, loaded thirty-four cars, while the mill machinery—a portion of which has already reached this point—amounts to about two hundred tons. This is probably the grandest mining operation ever undertaken in Eastern Nevada. Whether it will successfully be carried out to the advantage of the English capitalists remains to be seen, as undoubtedly its success chiefly remains with the managers at the mines. Judicious and careful management on the part of the agents here, with a view to economy and a strict guard against leakages and extravagance, will make one of the grandest successes ever undertaken in the State and amply reward its projectors."

Telegraphs in China.—The Shanghai correspondent of the *Times* writes: "Speaking of telegraphs, we are likely soon to be connected with Europe, despite the puerile exclusiveness of the Government. A Russo-Danish company is bringing down a cable from the Amoor, and the China Submarine Telegraph Company promises to lay a cable to Singapore, Hong Kong, and up the coast to Shanghai in the course of a short time. To neither, I believe, would the Pekin officials allow the right of landing even the shore end of the cable. All they would consent to was the laying of one which should be *bona fide* submerged. They probably thought this would quash the project; but the expedient of hulks can be resorted to. Yet one would think they must see that no convulsion of nature has followed the erection of telegraph wires in the foreign settlement of Shanghai, where we do not wait to ask permission. Two of the large steam companies have telegraphic communication along two miles of river front between their head offices and their wharves, and the municipal council have connected the several police stations in a similar way. The wire runs through a Chinese population of some 100,000; yet I have not heard that these people, who are represented by their rulers to be so deadly opposed to telegraphs, have even remonstrated or dreamt of regarding the wires otherwise than with curiosity."

Lighting Mines with Gas.—An important invention has just been patented by Mr. HUNTRESS, colliery manager, Mr. SWINBORNE, engineer, and Mr. WILSON, colliery manager, all of Werfield, near Barnsley, for improvements in the means of supplying mines and other places with gas. The invention has just been tested at the Werfield Main Colliery, in the presence of a number of mining and other engineers. The object of the invention is to supply mines and other works situated on a much lower level than the gasholder with lighting gas in a cheap and convenient manner. For that purpose there is employed and adapted the system of an inclined current, produced by a steam jet for drawing the gas into and forcing it down a pipe leading to a mine. When the combined current of gas and steam has arrived at its destination, or at or near to the bottom of a pit, it is led into a receiving vessel of convenient size and shape. The receiver serves to separate and condense the steam which collects as water at the bottom, and flows off by a syphon pipe. The gas goes off by a pipe from the top of the receiver, and is distributed to the burners in whatever direction required. Although the Werfield Main Colliery is one of the deepest in South Yorkshire, and the piping had to be taken down 335 yards from the surface, and the gas distributed in three districts to the extent of 100 yards in each, the entire cost of the plant, including gasometer, retorts, &c., was rather less than £400, whilst the same object by the ordinary mode would not, it is stated, be obtained at a cost of less than £1,000.

MARKET REVIEW.

The Coal Trade.

NEW YORK, September 23, 1870.

WHOLESALE.—There is a fair and steady trade doing. The large companies are doing a good business. There is a sufficient amount of coal being taken to prevent any rush later in the season, provided the present amount of business continues, which there is every reason to believe will be the case. The first quality of Lehigh Coals in the large sizes are scarce. Wilkesbarre Coals are also in good demand. The shipments from the various regions for the week ending Saturday last, were 357,005 tons, showing an increase of 43,349 tons over same week last year. Portions of the Schuylkill region are idle, in consequence of some disagreement on the labor question; but notwithstanding that such is the case, the shipments from that district for the week are fully up to those of last year. The total amount of coal shipped from all sources up to Saturday last was 11,115,380 tons. This does not include the shipments of bituminous coals. The surplus this year over last, is some 2,113,167 tons. That our general manufacturing interests are in a much better condition, and are running more generally and on extended time, there is no doubt. All branches of home industry are in a better condition this year, and there is every evidence of a large and healthy trade being done this fall. This will of course necessitate a greater consumption of fuel, and the surplus we show above will only be adequate for the demand.

The Scranton Company announce elsewhere in our JOURNAL their eighty-seventh sale, and offer 90,000 tons. This might be considered by many as offering an immense quantity of coal, which might break the price; but not so. They well show that the demand for October delivery will be heavy, and are only preparing for it. We do not apprehend any decline in prices at this sale. The sale will take place on Wednesday next, Sept. 28, at the usual time and place. Our large steamship companies and manufacturing establishments will no doubt be well represented, and be large purchasers, as there is every prospect of prices being fair and the time of delivery, October, is as late as they dare wait in the season. A lively competition may cause a slight advance in some sizes, but we look for the same prices as obtained last month. We really think that those dealers who are in the habit of using Scranton coal, should prepare themselves to purchase at this sale, as we are confident that the prices will be the lowest of the season.

RETAIL.—There is a good trade doing, considering the very warm weather of the past four days. Housekeepers are pretty generally satisfied with the retail prices and are laying in freely. Prices range from $6 to $7 for the Company Coals, and $7 50 for Lehigh.

FREIGHTS.—Vessels are very plenty, but freights are scarce. We quote, Boston, $1 70; New Haven, $1 00.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending September 17, 1870, compared with week ending September 18, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R.	85,463	2,317,387	97,591	1,963,699
Schuylkill Canal	10,257	465,402	25,573	224,069
Lehigh Valley R. R.	36,548	1,605,580	55,605	2,336,942
Lehigh & Sus. R. R.	12,264	544,094	21,160	715,925
Lehigh Canal	23,935	525,864	29,965	480,968
Scranton North	12,697	236,193	17,187	542,656
" South	27,289	677,276	39,314	1,244,009
Penn. Coal Co., rail	22,179	668,471	22,567	814,362
" " canal	598	12,985		13,096
Del. & Hud. Canal Co.	47,190	759,158		1,100,193
" " R. R.	336	103,479	10,864	330,099
" " south	3,583	54,798	11,295	330,484
Shamokin	12,174	291,859	13,070	329,851
Trevorton	1,900	279,686	1,857	65,479
Lykens Valley Coal Co.	2,289	50,658	5,751	97,730
Wyoming South		190,574		193,419
Wyoming North	6,745	35,721		
P. N. Y. C. & R. R. Co.			5,789	214,571
Williamstown, Col'y	5,244	140,913	6,347	210,916
Short Mountain	2,386	21,923		
Big Lick Colliery				
Total	313,656	9,002,221	357,005	11,115,380
1869			313,656	9,002,221
Increase week and year.			43,349	2,113,167

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Sept. 17, 1870, compared with week ending September 18, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	21,000	701,000	25,185	691,195
C. & O. Canal	15,000	423,000	15,316	437,302
M. & H. T. R. R.	8,118	253,814	6,554	218,852
Harrisburg & D.	13,056	....	16,770	....
L. V. R. R.	....	552	....	9,899
P. & N. Y. C. & R. Co.	....	....	5,855	181,213
	57,174	1,378,366	49,580	1,538,361

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, Sept. 15, 1870:

From St. Clair	33,237 03
" Port Carbon	6,858 16
" Pottsville	3,657 11
" Schuylkill Haven	33,367 16
" Auburn	4,512 17
" Port Clinton	15,866 00
" Allentown and Alburtis	111 14
" Harrisburgh and Dauphin	16,770 03
Total paying freight	114,382 00
Coal for Company's use	1,974 18
Total for week	116,336 18
Previously this year	2,428,414 02
Total	2,544,751 00
To same time last year	2,261,264 10

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, September 8, 1870.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	25,573 00
" Port Clinton	1,845 00
Total for week	27,418 00
Previously this year	196,651 10
Total	224,069 10
To same time last year	465,402 00

Delaware, Lackawanna, and Western Railroad.

COAL Transported for the week ending Saturday, September 19, 1870.

	WEEK. tons. cwt.	YEAR. tons. cwt.
Shipped North	17,187 10	542,656 16
Shipped South	33,334 07	1,244,009 08
Total	50,521 17	1,786,666 04
For the corresponding time last year.		
Shipped North	12,697 00	296,183 11
Shipped South	27,289 11	677,276 07
Total	39,986 11	913,459 18
Increase	10,535 06	873,206 86
Decrease		

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, Sept. 17, 1870.

	WEEK.	SEASON.
By Del. and Hud. Canal		1,100,193 00
By Railroad	10,844 00	330,099 00
South	11,295 00	330,484 00
Total	22,179 00	1,760,776 00
Corresponding time in 1869.		
By Del. and Hud. Canal	47,190 00	759,158 00
By Railroad	336 00	103,479 00
South	3,583 00	54,798 00
Total	51,109 00	917,435 00
Increase	843,341 00	

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending September 17, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct	WEEK, 1869. tons ct	YEAR 1870, tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	25022 13	15076 17	959812 08	545721 16
Upper Lehigh Region	3710 03		104527 18	77288 03
Mahanoy Region			1455 04	2436 01
Hazleton Region	8738 07	1273 14	211655 18	119055 02
Beaver Meadow Region	4589 12	4985 01	134496 19	83401 01
Mauch Chunk Region	11817 15	16065 02	92168 01	282207 07
Totals	54778 10	37300 14	1374116 06	1114109 10
Increase	17477 16		260006 16	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	21160 14	12264 04	715925 18	544094 19
Forwarded East of Mch Chunk by Canal	28965 02	23935 06	480986 02	525864 00
Delivered at and above Mauch Chunk	969 14	720 19	30415 19	23775 17
Delivered to L. & B. R. at Plymouth Bridge	3683 00	380 05	146788 07	15223 11
L. V. R. R. at Sugar N.				5161 03
Totals	54778 10	37300 04	1374116 06	1114109 10
Of the above there was transported on acc'nt of L. C. & N. Co.	13701 12	16840 05	116207 07	307777 10
W.-B. C. & I. Co.	15411 05	6426 15	403331 00	281538 18
Totals	29112 17	23267 00	519538 07	588314 08
Increase	5845 17			
Decrease			68778 01	

Report of Coal Transported over Lehigh Valley Railroad

For the week ending September 17, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	10,084 07	456,147 17	466,232 04
" Hazleton	43,299 01	1,529,799 13	1,573,098 14
" Upper Lehigh	220 01	10,570 07	10,790 08
" Beaver Meadow	14,091 03	556,168 07	570,259 10
" Mahanoy	8,673 12	189,030 04	197,703 16
" Mauch Chunk	53 09	603 00	656 09
Total Anthracite	76,421 13	2,742,319 08	2,818,741 01
Bituminous Coal recv'd from Cats. R. R.			
N. C. R. R.			
E. P. R. R.		9,899 00	9,899 00
P. & N. Y. C. & R. R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	76,421 13	2,752,218 08	2,828,640 01
Same time last year	43,406 09	1,823,177 12	1,866,584 01
Increase	33,015 04	929,040 16	962,055 00
Decrease			
Forwarded East from M'h Chunk by rail	55,605 01	2,181,337 12	2,236,942 13
Same time last year	36,548 11	1,569,042 08	1,605,590 19
Increase	19,056 10	612,295 04	631,351 14
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	55,605 01	2,181,337 12	2,236,942 13
To N. C. R. R., at Mount Carmel	621 10	2,369 03	2,990 13
Forwarded North from L. & B. Junction	5,784 09	208,300 19	214,085 08
To L. & S. R. R. at Packerton for rail	195 06	5,925 03	6,120 09
Delivered at M'h Chunk	14 05	878 03	892 08
Delivered on line of road above Mauch Chunk	71 03	7,816 18	7,888 01
Delivered above M. Chunk for use of L. V. R. R.	1,077 02	39,530.01	40,607 03
To L. & S. R. R., at P'n Hav., for railroad			
Do. for canal	8,403 05	195,814 11	204,277 16
At M.Chunk for canal	4,589 12	100,346 18	104,936 10
Total Anthracite	76,421 13	2,742,319 08	2,818,741 01
Bituminous Coal		9,899 00	9,899 00
Total all kinds	76,421 13	2,752,218 08	2,828,640 01

Shipments of Cumberland Coal

for the week ending Saturday, September 17, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	.....	.....	.....
Borden	1,450 15	2,372 01	3,822 16
Consolidation	5,613 02	3,270 06	8,883 08
Spruce Hill	354 19	.....	354 19
Midlothian	612 19	346 14	959 13
H. and Baltimore	....	794 18	794 18
do Va M	355 09	.....	355 09
V C & I Co	1,268 04	.....	1,268 04
G. C. C. and I	1,272 15	571 13	1,844 08
Maryland	2,802 09	4,626 07	7,428 15
American	1,145 04	3,334 16	4,480 00
Atlantic	678 11	.....	678 11
Piedmont	1,284 00	.....	1,284 00
Swanton	1,226 01	.....	1,226 01
Barton	968 00	.....	968 00
Potomac	1,445 10	.....	1,445 10
Franklin	2,017 14	.....	2,017 14
Big Vein	2,690 06	.....	2,690 06
Total week	25,185 17	15,316 15	40,502 12
Previous	666,009 10	421,885 09	1,087,894 19
Total year	691,195 07	437,202 04	1,128,397 11

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending Sept. 17, 1870.

	1870. WEEK.	1870. YEAR.	1869. WEEK.	1869. YEAR.
By Railway	22,567 09	814,362 02	22,179 15	688,471 03
" Canal		13,936 09	598 03	12,985 11
Total	22,567 09	828,378 11	22,777 18	701,456 14

Increase, 1870, 126,921 17 tons.

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending Sept. 17, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	5,789 09	208,781 18	214,571 07
Bituminous	5,855 00	175,358 00	181,213 00
Total, Ant. and Bit.	11,644 09	384,139 18	395,784 07

Summit Branch Railroad Company.

The following is the quantity of Coal shipped from Williamstown Colliery, for week ending Saturday, September 17, 1870: 6,347 01

Same time last year: 5,244 06

Decrease, Tons: 1,102 15

Total amount shipped to date: 210,916 01

Same time last year: 140,913 03

Increase, Tons: 70,002 18

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending Sept. 1, 1870:

	Tons.
For week	16,770 03
Previously this year	535,695 16
Total,	552,465 16
Same week last year	13,056 00

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, September 23. R. A.	W. A.	AT PHILADELPHIA, September 23. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$5 00	4 75	4 50
Steamer	— —	5 00	— —	4 50
Broken	— —	5 50	— —	4 50 to 4 75
Egg	5 75 to 6 50	5 50 to 6 00	— —	4 50 to 4 75
Stove	5 75 to 6 50	5 50 to 6 00	— —	4 50 to 4 75
Chestnut	4 50 to 5 60	6 25 6 75	— —	4 25 to — —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side) cpd	6 10	— —	— —	— —
Broken	5 85	— —	— —	— —
Egg	5 85	— —	— —	— —
Stove	6 10	— —	— —	— —
Chestnut	5 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 50		— —	— —
New England	" — —		— —	— —
Locust Dale	W. A. 6 25		— —	— —
Honey Brook, Le'h	W. A. 4 75 to 5 75		— —	— —
Spring Mountain	" " 4 75 to 5 75		— —	— —
Sugar Creek	" " 4 75 to 5 75		— —	— —
Sugar Loaf	" " 4 75 to 5 75		— —	— —
Old Comp'y's	" " 4 75 to 5 75		— —	— —
Cross Creek	" " 4 75 to 5 75		— —	— —
Enterprise	" " — —		— —	— —
Girardville	" " — —		— —	4 75
McMichael	" " — —		— —	4 75
Shamokin	" " 5 50		6 25	— —
Lykens Valley	" " — —		5 75	— —
Broad Top	" " 5 50		— —	— —
Hill & Harris	" " — —		4 75	— —
Henry Clay	" " — —		5 00	— —
Powelton	" " 5 50		— —	4 75

[*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

	F. L.	Bro.	Gra.	Eg.	Sto.	Cat.
Lehigh	$3 00	$3 75	$3 75	$3 25	$4 00	$3 00
Wilkesbarre	3 00	3 75	3 75	3 75	4 00	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein...f.o.b. at Phila	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	4 75
Cumberland C. & I. Co.'s on board	N. Y. 7 00
Maryland Coal Co. "	" 7 00
Consolidated Coal Co.'s "	" 7 00

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	4 60	4 75	4 25	5 25	5 75	4 75
Pittston at Newburgh	5 00	5 00	5 20	5 30	5 50	4 70
Lackawana at Rondout	4 50	4 60	4 90	5 00	5 50	4 50
Wilk'b're at Hoboken	4 75	4 75	5 25	5 25	5 75	4 75
Old Co. Lehigh at Pt. Johnston	6 25	6 00	6 00	6 00	6 25	5 25
Lehigh at E. Port	5 75	5 50	5 50	5 50	5 75	4 75

For freights to different points, see "Freights."

Prices at Baltimore—September, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do	5 00@5 25
Shamokin Red or White Ash, do	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 5@— —
By retail, all kinds per ton of 2240 lbs	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

September, 1870.

George's Creek and Cumberland f. o. b. for shipping: $4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@— —
Lykens Valley	— —@— —
Shamokin Red or White Ash	— —@— —
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

September, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

Duty, $1 25, gold.

	Coarse.	Slack.
Block House	$1 75	@— 75
Gowrie	1 75	@— 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 75	@— 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse.	Slack Currency.
Fairmount Gas Coal Co. of N. Y.	7 50	@— —
Despard Coal Co	$7 50	@— —
Penn	— —	@— —
Newburg Orrel Gas	— —	@— —
West Fairmount Gas Coal	8 00	@— —

AT PHILADELPHIA.

Powelton: $7 80

Prices of Foreign Coals.

September, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	11 00@12 00
" House	15 00@16 00
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon: $2 00

Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 84
C. R. R., N. J., Easton to Elizabethport	1 27
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 46

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 84
C. R. R., of N. J., Easton to Pt. Johnson	1 34
Shipping expenses	25
Warfage	10
Total	$2 53

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 84
Morris & Essex R. R. Easton to Hoboken	1 34
Shipping expenses	25
Warfage	10
Total	$2 53

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R.	1 14
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	84
C. RR. of N. J. Easton to Elizabethport	1 27
Shipping expenses	25
Wharfage	10
Total	$2 46

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris "	1 10
Freight	
Towing	
Total	$ 2.50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris "	2 00
Freight	
	2 40
For re-shipment	2 20
Total	$4 60

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	1.03
Freight	55
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven	$ 40
Bridgeport	40
Southport	40
Westport	40
Norwalk	40
Stamford	40
	Per Boat.
Greenwich	$70 00
Port Chester	80 00
Mamaroneck	70 00
Glen Cove	60 00
New Rochelle	55 00
East Chester	60 00
West Chester	30 00
White Stone	30 00
College Point	25 00
West Farms	25 00
Flushing	30 00
Harlem and Mott Haven	20 00
Port Morris	20 00
Ninety-first street and Astoria	16 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

TO RIVER PORTS

Boats of 150—250 Tons.

	Per Ton.
To Manhattanville	8 cents
Spuyten Duyvil	8 "
Yonkers	9 "
Hastings	10 "
Piermont	12 "
Dobbs' Ferry	12 "
Nyack	14 "
Tarrytown	15 "
Sing Sing	16 "
Croton Landing	17 "
Haverstraw	17 "
Verplanck's	17 "
Peekskill	18 "
West Point	20 "
Cold Spring	20 "
Newburgh	18 "
Poughkeepsie	22 "
Rondout	23 "
Boats of 100 Tons	Per Boat.
To Manhattanville, and Return	$11 00
Spuyten Duyvil	13 00
Yonkers	15 00
Sing Sing	20 00
Peekskill	25 00

Freights.—SEPTEMBER, 1870.

TO EASTERN PORTS.	From Philadel'a.	From E. Port and Port Johnston.	From Newburg	From Rondout
Amesbury	$2 50	$2 15	$	$
Bangor	2 80	1 90	1 60	
Bath	2 75	2 00	— —	
Boston	2 50	1 90	2 25	1 90
Bridgeport	1 60	1 00	1 10	1 20
Bristol	2 30	1 40	1 40	
Cambridgeport	2 50	1 40		
Derby	2 00	1 20		
Dighton	2 30	— —	1 45	
East Cambridge	2 80	2 30		
Fall River	2 30	1 40	1 40	
Hackensack	1 75	1 50		
Hartford	2 50	1 35		
Jersey City	1 35 to 1 55	60		
Middletown	2 25	1 25		
Mystic	— —	1 25	1 30	
New Bedford	2 35	1 40		
Newburyport	2 50	2 10		
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 20	1 25	1 30
Newport	2 30	1 40	1 40	
New York	1 35 to 1 50	1 60	70	
Norwalk	1 80	1 00	1 05	
Norwich	2 30	1 25	1 35	1 40
Pawtucket	2 30	1 50	1 60	
Portland	2 70	1 75		
Portsmouth, N. H.	2 90	2 10		1 85
Providence	2 30	1 40	1 45	1 45
Rockport	2 10	— —		
Saco	2 75	2 10		
Sag Harbor	1 70	1 40	1 30	
Salem	2 50	1 90	2 25	2 35
Stamford	2 00	1 00	1 00	
Stonington	2 00	1 30	1 25	
Taunton	2 30	2 00		
Warren	— —	1 40	1 45	
Washington	1 50			
TO RIVER PORTS.				
Albany		90	60	
Catskill		— —	50	
Cocksackie		— —	60	
Coeyman's		— —	75	
Cold Spring		— —	35	
Fishkill		— —	30	
Haverstraw		50	60	
Hudson		— —	50	
New York		— —	70	
Nyack		60	60	
Poughkeepsie		— —	35	
Rhinebeck		— —	30	
Rondout		— —	— —	
Saugerties		— —	40	
Sing Sing		— —	75	
Stuyvesant		— —	55	
Tarrytown		80	75	
Troy		90	75	
West Point		— —	35	
Yonkers		40	90	

Foreign and Provincial Freights.

September, 1870.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s. @15. ton
TO NEW YORK.	
Provincial	
Sidney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—
TO BOSTON.	
Sydney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

METALS.

NEW YORK, September 24, 1870.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb: Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1½ to 1¾ cents ℔ lb; Pig, 9 ℔ ton; Polished Sheet, 3 cents ℔ lb.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	33 00@37 00
Pig, American, No. 1	33 00@34 00
Pig, American, No. 2	31 00@32 00
Pig, American, Forge	27 00@29 00
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	— —@110 00
Bar, Refined " "	80 —@ 85 00
Bar, Common " "	75 00@ 80 00
Scroll " "	97 50@130 —
Ovals and half-round " "	100 —@125 —
Band " "	95 —@ — —
Horse Shoe " "	95 —@ — —
Rods, ⅜ to 3-16 inch " "	85 —@120 —
Hoop " "	105 —@150 —
Nail rod, less 5 ℔ ct.	— 7@— 7½
Sheet, Russia, as to Nos. (gold)	— 11@—11½
Sheet, Single, D. and T. Common	— 5@— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ℔ ton	57 00 @59 00
Rails, American, at Works in Pa.	70 00 @71 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ ℔ or under, 2½ cents; over 7 cents and not above 11, 3 centsore lb; over 11 cents, 2½ cents ℔ lb, and 10 ℔ cent ad val. (Sit prices.)

English Cast (2d and 1st quality) ℔ lb	— 15	@— 18
English Spring (2d and 1st quality)	— 7	@— 10
English Blister (2d and 1st quality)	— 10	@— 17
English Machinery	— 11½	@— 14
English German (2d and 1st quality)	— 13	@— 15
American Blister "Black Diamond"	— —	@— 12
American, Cast, Tool do.	— 17	@— 18
American, Spring, do.	— 9	@— 11
American Machinery, do.	— —	@— 12
American German, do.	— 9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 30
Copper Braziers, 16oz. and over	— @— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	— @— 19
Copper, Chili Pigs	— @— —
Copper, American Ingot	20 @— 21½
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$— @— —
Spanish (gold)	6 32½@6 37½
German, do.	6 20 @6 87½
English, do.	6 37½@6 62½
Bar (net)	8 25 @8 50
Pipe (net)	— @8 25
Sheet	8 25 @8 55

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent. ad val.

	Gold ℔ lb.
Banca	36½@37
Straits	34 @35
English	— @32½

PLATES.

Fair to Good Brands.	*Gold.*	*Currency.*
I. C. Charcoal, ℔ box	$8 62½@8 87½	$10 25 @11 75
I. C. Coke	7 50 @8 —	9 25 @ 9 75
Coke Terne	6 00 @6 75	7 75 @ 8 00
Charcoal Terne	7 75 @8 —	9 50 @ 9 75

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ 100lb

	Gold.
Plates, Foreign ℔ 100 lbs.	$6 32½@ 6 35
Plates, Domestic ℔ lb.	08½@- 11½

REMARKS:

IRON.—The demand for Scotch Pig continues active, and in the absence of adequate supplies, business is in a measure restricted, and prices have further appreciated. Holders are not anxious to realize, even at the advanced rates. The sales are 300 tons Eglinton at $32 75@$33, closing at the latter figure; and 400 do. Glengarnock, $32 75 ex ship, mostly resold at $34@34 50, and now held at $35@35 50 from store. American has been rather quiet since our last, but prices are unchanged; there are some sales reported, but we are unable to learn the particulars. Of Wrought Scrap, 150 tons have been taken on private terms. Rails are in moderate request at the quotations noted in our last; 400 tons old Double-Headed sold at $39 50 gold and $45 50 currency; and 500 do. 56-lb. Fish, on private terms. Refined Bar, from store, continues as last noticed, little doing in any shape, either from store, or from importers' hands—the makers ask more at the Mills than Jobbers quote from store. Russia Sheet continues dull, and we hear that there is some offering at 10½c. gold—Common Sheets are steady at old prices.

STEEL.—There is no change to note in any description—we quote from store, English Cast, 2d and 1st quality, 15@18 cents, and American Cast, Tool, 17@18—English Spring 7@10, and American do. 9@11—English Machinery, 12, and American do. 12, English Blister 10@17, and American do., 12—English German 13@15, and American do. 9@11, all cash.

TIN.—Pig continues very quiet, and prices are nominal at 34½@35 cents for Straits, 32½ for English, and 36½@37 for Banca, all gold. Plates have also been very dull, and we have only to report sales of 350 bxs. Charcoal Terne, at $7 75@7 87½ gold, and 500 do. Assorted Charcoal Tin, on private terms.

COPPER.—New Sheathing and Yellow Metal remain unchanged—we quote the former 30 and the latter 22 cents. Ingot is a trifle lower and more active—sales 7@8,000 lbs. Lake, October and November delivery, at 21¼ cents. We quote Lake on the spot 21@21½, and Baltimore 21 cents.

LEAD.—There has been a little more demand for Foreign, and prices are a trifle firmer; 125 tons Spanish sold at $6 30 gold. Bar $8 25@8 50. Pipe $8 25, and Sheet $8 25@8 55 net cash.

ZINC.—Am. Oxide, 6½ @ 7; French do., 11 @ 11½; Sheet do., 9½ @ 9¾.

MANGANESE—4 @ 4½ cents.

Mining Stocks.

NEW YORK, Sept. 21, 1870.

Mining Stocks are dull. So dull in fact that the board has discontinued the publication of the usual list of prices. At the morning session sales of Grass Valley transpired at 26@30c., consolidated Gregory at 80c., and Mendota at 50c.

Petroleum Stocks are lower, with no sales of any consequence at the board. Following is the list of prices ruling this day compared with those of last week:

	Sept. 15. Bid.	Sept. 15. Asked.	Sept. 21. Bid.	Sept. 21. Asked.
Bennehoff	25	40	20	40
Bergen Coal and Oil	40	—	—	—
Blood Farm	50	—	50	—
Brevoort	—	—	50	—
Buchanan Farm	45	—	45	—
Central	54	68	62	65
Home Petroleum	1 00	—	1 00	—
N. Y. and Alleghany	1 75	—	1 75	2 75
National	10	—	—	—
Northern Light	—	75	—	—
Phillips' Pet	15	25	15	—
Pithole Creek	1 10	1 25	1 00	1 10
Rathbone	—	40	—	40
Rynd Farm	28	32	25	30
Second National	—	75	—	—
United Petroleum Farms	15	—	16	19
United States	—	75	—	75

San Francisco Stock Market.

(By Telegraph.)

PER SHARE.	Sept. 13.	Sept. 20.
Savage	40½	36½
Crown Point	55¾	—
Yellow Jacket	26	26¾
Kentuck	45	40
Cholar Potosi	—	54
Gould & Curry	144	143
Ophir	—	—
Alpha	—	—
Belcher	2	2½
Imperial	27	No sales.
Hale & Norcross	—	—
Amador	230	—
Empire Mill	1	—

The Slate Trade.

NEW YORK, Sept. 24, 1870.

Our reports this week are increased by returns from our special correspondent at Hydeville. We had anticipated some difficulty in getting the reports up in proper shape, but they come in all correct, and we think in as good form as could be devised. The prices of slate remain unchanged at our quotations. The demand, we think, is a shade better than it was during the early summer. It is not to be doubted that the trade has been more influenced by the dull times than almost any other, yet there seems to be now a change for the better taking place, and we hope before long to be able to record a more decided improvement in the business.

Our cotemporary the *Slatington News* (Slatington, Pa.), has a very sensible communication this week upon "Our Slate Opposition." While believing competition to be the life of trade, the writer severely condemns the practice of finding fault with and disparaging the quality of the stock produced by opposition companies. After speaking of the way in which the officials of one quarry sometimes cry down the quality of the slate produced by a neighboring company, he goes on to say:

"In order that individual companies may be successful, it is essentially necessary that the fame of every company may be established—that it be known over the country that in this region we supply the best slate that can be had anywhere. Those will best promote their own success, therefore, who seek to keep up the name this locality has won for its slate; who will not say—'My neighbor's slate is not a good quality—will not retain its original color—is not in fact the article he represents it to be.' For those who question the veracity of their neighbors will soon come to have their own questioned, and will thus not only drive business away from their neighbors, but from themselves. It will be, therefore, for the good of everyone that the character of their neighbors' goods remain untarnished and undisputed. Let everyone seek to sell, and sell below his neighbor if he can without injury to himself or the business, but in no case let him make a sale at the expense of that good name on which our town depends for its existence and prosperity."

These remarks are very just, and apply not only to the town of Slatington, of which the author was speaking, but to each and all of the slate regions. Healthy, honest competition is an advantage tending to stimulate trade. It makes it necessary to carry on business in the most careful manner, but an opposition that strives to obtain trade by pulling down others is decidedly ruinous.

Prices of Slate in New York.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, "	5 75@ 6 25
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N.Y., via the R. & S. R. R., for the week ending September 17, and for the year 1870.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
Penrhyn Slate Co	65	3,450	3,515
New York Slate Co	525	2,425	2,950
Middle Granville Slate Co	....	361	361
*American Slate Co	....	....	....
Benj. Williams	152	628	780
Jones & Williams	....	....	....
Eagle Slate Co	....	153	153
H. W. Hughes	16	40	56
Total	758	7,057	7,815
Total for year as far as reported			7,815

* Penrhyn and American Co.'s shipments are consolidated for this season.

MILL STOCK.

NO. OF CASES.	Week.	July.	Aug.
Eagle Slate Co	2 cars.	5 car.	7 car.
Penrhyn Slate Co	.....	.....	.....

MANTELS, &C.

NO. OF CASES SHIPPED BY	Week.	July.	Aug.
Eagle Slate Co	cases		
Penrhyn Slate Co	" 112	871	983

Hydeville, Vt.

ROOFING SLATE.

	WEEK.	PREVIOUSLY.	YEAR.
Eagle Slate Co. sqs.	48	..	..
Blue Slate Co	200	..	..
The Evergreen Slate Co	190	..	..
Forest Slate Co	80	..	..
West Castleton	60	..	..
E. D. Billings	19	..	..
Total	597	..	..

MILL STOCK.

Eagle Slate Co. cases	80 .. ..
Western Vermont boxes	14 .. ..
Total	94 .. ..

FINISHED MANTELS.

West Castleton Slate Co. cas.	89 .. ..
Forest Mining "	34 .. ..
Total	113 .. ..

BILLIARD BEDS AND BLACK BOARDS.

Eagle Slate Co. box.	20 .. ..
Western Vermont	30 .. ..
Total	50 .. ..

TILE.

Eagle Slate Co. box.	43 .. ..

PENNSYLVANIA SLATE TRADE.

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending September 17, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	175 squares.
Girard Slate Co	140 "
Jones & Town	105 "
American	70 "
Heimbach Slate Co	35 "
Kuntz & Woodring	140 "
Saylor & Morgan	105 "
J. Anthony	35 "
D. Thomas	140 "
Lehigh Slate Co	35 "
D. Williams & Co	35 "
R. Hughes	35 "
Total	1,050 "

SCHOOL SLATES.

A. W. Lerch	27 cases.
D. Williams	38 "
Locke Slate Co	47 "
Lehigh Slate Co	119 "
Total	231

MANTLES.

Lehigh Slate Co	12 cases.
Yerkes & Martin	46 "

BLACK BOARDS.

Lehigh Slate Co.	7 cases.
Yerkes & Martin	5 "
Total	24 "

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Eagle Slate Co	105 squares.
J. M. Coffin & Co	70 "
H. W. Harper	35 "
Philadelphia Slate Co	35 "
Total	245 "

	Week.	Previously.	Total for Year.
L. and S. R. R.	245	6,492	6,737
L. V. R. R.	1,050	15,362	16,412
Lehigh Canal	...	2,454	2,454
Total	1 295	24,308	25,603

Safe Deposit Companies.

THE institution of safety deposits is in its present form quite recent; but it has already established itself strongly in the favor of the public. People used to pester their bank friends by putting bonds, money and plate on special deposit in the bank safes; but several unpleasant cases have taught the lesson that the bank is never, under such circumstances, responsible for the loss or destruction of the deposit. It merely does a favor to its customer, and enters into no contract with him.

The Safe Deposit Companies, on the other hand, are responsible. Moreover, it is their only business to watch over the treasures committed to them; and the precautions they observe far exceed those which are possible in ordinary banks.

It would be well worth the while of the curious to visit the new offices and vaults of the Mercantile Loan and Warehouse Company, in the splendid granite building of the Equitable Life Insurance Company, on the corner of Broadway and Cedar street, in this city. We believe that for beauty, convenience, strength, security, and extent, they are unequalled. The sub-basement vault, intended for the storage and safekeeping of heavy packages, such as silver, specie, etc., is 28 by 33 feet, built of granite blocks, two feet thick, all firmly clamped and welded together. The entrance is secured by two massive welded steel and iron doors, and four first-class doors.

Large vaults for the storage of light articles of value, such as pictures and other works of art, are built in connection with the above, affording great convenience and perfect security to parties having valuables of that character, who require a safe depository while absent from the city or otherwise.

The upper, or general business vaults, resting upon the above, are constructed of welded steel and iron, under the "TERWILLIGER'S Patent," by Messrs. J. B. & J. M. CORNELL. The outer walls are 2½ inches—double the thickness of any heretofore made for similar purposes—secured together in the most approved manner with conical steel and iron bolts and screws. The steel is of the highest quality, and hardened with great care, and drill proof. At each entrance there are double doors of the same material, each most completely bolted, and secured with two first-class combination locks. The small, or inside safes, combine many new features, are of much greater strength than usual, and fitted with both dial and key locks.

A peculiar feature of the company's business is the reception of deposits for periods of days or weeks, as well as by the month or year.

Articles of value are received for safe keeping, (at a rate less than that charged by Insurance Companies for fire alone,) in amounts without regard to value and for any time, at the convenience of the depositor. This affords to strangers visiting New York the long desired opportunity of leaving jewelry, money, or other valuables under guaranty for their safety. The company furnishes its customers at the same time, free of charge, office-room for the transaction of business, perusal of daily papers from all parts of the country, etc. The authorised capital is $5,000,000, and the Board of Trustees embraces many eminent names. Mr. Wm. J. Pease is President; Thos. U. Smith, Vice-President, and W. H. Miller, Superintendent of Safe Deposits. The latter gentleman is particularly fitted for his position—the duties of which incur great responsibility, and require eminent business qualifications.

Patent Decision.

WE take the following important decision of the Commissioner of Patents from the *National Republican*, which will, no doubt, be a precedent for the refusal of other like cases:

"Commissioner Fisher has written a lengthy decision in the case of the application of MUSHET for an extension of his patent for an improvement upon the Bessemer mode of making steel, refusing an extension mainly on the ground that the act of July, 1870, forbids the continuation of a foreign patent in this country after the patent granted by the foreign country has expired. The Commissioner holds that while the act of July, 1870, could not retroactively affect a patent granted prior to that act, it does cut off the granting of an extension in such case, for the extension can in no way be construed as a vested right, the inventor receiving in his original patent all that he had any right under the law to claim. In other words, that the granting of an extension is a new act of bounty to the inventor, and must be governed by the laws existing at the time such extension is applied for.

"It seems that MUSHET, who is an Englishman, after patenting his invention or discovery in England, allowed it to lapse for non-payment of the stamp duty, which should have been paid at the expiration of three years from its date, so that for eleven years the process has been without protection in England, while in this country its use has been virtually stopped by the American patent, except as it was used by the holders of the patent.

"The decision seems a just one, for it never could have been the intention of our lawmakers to compel our own manufacturers to pay royalty to an alien while the manufacturers of his own country could escape such payment, and thereby compete with all the advantages on their side.

"The application of HOSEA BULL, of New York, for an extension of his patent for an improvement in ovens, has been granted. This is considered a very useful and valuable oven among bakers.

"The Commissioner has affirmed the decision of the Board of Examiners-in-Chief refusing a patent to WILLIAM W. WILLIAMS, administrator of ELI SANDERS, deceased, for an improvement in horse-rakes. This is one of the cases of an attempt to revive an old application, in an amended form, after a lapse of many years, during which the principal features of the invention have been developed in other inventions for which patents have been granted."

Large Pumping Engines.

A SET of the largest pumping engines yet made have just been completed by Messrs. GWYNNE & Co., of the Essex Street Works, Strand; they are to be erected in Denmark for some heavy drainage works, to reclaim 20,000 acres of land for the Nissum Fjord Company, and of the most approved construction. The manufacturers are confident that the engines and pumps will raise 40,000 gallons (178¼ tons) 12 feet high in one minute, which is nearly 50 per cent. more than contracted for. The machinery consists of a pair of engines, four feet apart from centre to centre, coupled with one pump on each side. The engines are 21 inch stroke, mahogany lagged, running at 140 revolutions (490 feet piston speed) per minute, and consuming 3 pounds per horse-power per hour; vacuum, 27 inches. The pumps are constructed on Messrs. GWYNNE & Co.'s well-known centrifugal principle, and are 42 inches diameter in the pipes. The same manufacturers will shortly have completed a combined pumping engine for the Punjaub Railway, to discharge 1,000 gallons per minute 60 feet high.—*Mechanics' Magazine.*

Nevada Silver Mines.

IV.

REESE RIVER DISTRICT.

TO THE EDITOR: SIR—I do not intend to give you a long article on the Lander Hill mines, for these are now practically all worthy of notice in Reese River District, no other mines of any note being worked. The veins of this hill have been so often and so correctly described, that it is impossible to add anything of interest to essays formerly brought before the public. I will only say here, in regard to them, that they are the only true fissure-veins I have seen in Nevada, though a few are said to occur to the East and South, east of White Pine. Much expense has been occasioned in working the Lander Hill mines, by the frequently occuring faults in all the veins, which sometimes throw their lower portions hundreds of feet out of the plane of the upper part. The veins being narrow, this has, in spite of their richness, brought about the abandonment of many, and at the time of my visit only the mines of the Manhattan Company, the North Star, and Oregon, and the Buel North Star (belonging, I believe, to an English company), were at work. I mean to say that these mines are the only ones of note now worked; many others are worked in a small way, yielding, perhaps, one or two tons per month, but they hardly pay their way. The ores of all these veins are, as is well known, ruby-silver, dark and light, polybasite, euargite, stephanite, and principally fahlerz; silverglance is rare.

A pleasing peculiarity of the veins is, that the ores in them do not get poorer in depth, but they have rather improved so far. This will, of course, have its limits; but this much is certain, that the future of these mines is as assured and certain as it can be in the best of mines.

The difficulty of cheap reduction of these refractory ores has been most happily overcome by the Stetefeldt furnace. You are aware that one has been built at the Manhattan mill, but I believe you are, so far, not acquainted either with its construction (differing somewhat from the former pattern) or with the highly favorable and gratifying results reached with it. I cannot give you, at this time, a full description of the furnace, as it would require drawings, which I have not the facilities to make while on the wing; but I have made arrangements to procure for you both description and drawings at some future time. I shall give you a short sketch only, and, what is most important to the majority of your readers, the results of the last month's actual working, as derived from the certificate of Mr. ALLEN A. CURTIS, the efficient agent of the Manhattan Company, to whose foresight and sagacity the company is principally indebted for the introduction of the furnace. The Stetefeldt furnace at the Manhattan mill is larger than that at Reno, and instead of being heated by a wood fire, is heated by the gases produced from charcoal in two gas-generators. A third generator produces the gases for heating and chloridizing the dust drawn over into the main flue by the strong draft.

The impression at once received by looking at the furnace is that you have an extremely solid and strong work before you; one that is not apt to require many repairs for years to come. And, in fact, in this lies one of the main features of the furnace, so well illustrated by the one at Reno, which has now been continually running for over a year, without requiring the least repairs. And the Reno furnace is not nearly as well built as that in Austin. Any one who knows what an expense is continually incurred by the repairs necessary in reverberatories, will be able to appreciate this feature of the furnace. The entire height of the furnace from the cooling floor to the hopper is nearly thirty feet; while the actual distance through which the pulverized ore and salt fall against the flame is about eighteen feet. The flame from the generators enters the furnace a little over six feet above the cooling floor, and the bottom of the flue above is four feet six inches below the top. The inside size of the shaft, at its lower end, is five feet square. The bottom inclines towards the discharge door, and tapers towards the top, where the size of the shaft is reduced to three and a half feet square. The feeding machinery is a very perfect arrangement, but it is not easy to describe it without the aid of drawings, and I think I had better not attempt it at present. It is enough to say here that it sifts the ore into the furnace, finely divided, in a continual shower.

A very extensive system of dust-chambers is connected with the furnace. As the dust has to pass the fire-place in the main flue, before it can reach them, the ore found here is always the most perfectly roasted. From the dust chambers the waste heat passes under the large dry-kiln and thence into the chimney. The following are the working results of the furnace, according to Mr. ALLEN A. CURTIS, Agent of the Manhattan Company for the last month:

Quantity roasted per day, 22 tons.	
Labor of eight men, including coolies, $30 50; per ton	$1 39
Fuel: 3,100 bushels coal at 29c., for 312 tons; per ton	2 68
Salt: 53,315 lbs.; cost, $886 38 for 312 tons; per ton	2 77
Total cost of roasting per ton in Stetefeldt furnace	$6 84

This compares with the former roasting in reverberatories as follows:

Labor: 22 men, cost $2,212 for 347 tons; per ton	$6 37
Fuel: 236 cords wood at $8—$1,880 for 347 tons; per ton	5 42
Salt: 70,017 lbs., cost $1,234 14, for 347 tons; per ton	3 56
Total cost of roasting in reverberatories	$15 34

This shows a saving per ton of $8 51 cents, which is enormous. Mr. CURTIS, in his letter, concludes: "I think the saving hereafter will be much greater. The working of the present month (August) will, I judge from tests made thus far, reach ninety per cent. fully."

I need not tell you what a blessing such an apparatus must be for the Nevada silver mines, and the fact that two more furnaces are already built at Mineral Hill, and at the Monte Christo Mill, White Pine, shows how it is apppreciated.

The Manhattan Company's own mines cannot supply the furnace and mill, and they do, therefore, a great deal of custom work. At present they are working very rich ores, which, for the month of August, average $300 per ton.

The product of Lander county during the last quarter of the fiscal year does not make as good a show as during the previous one, because the Manhattan mill was stopped for nearly four months, on account of the construction of the Stetefeldt furnace.

The following is the product during the year:

For the quarter ending	Sept. 30, 1869	1,762 tons, value	$253,197
" "	Dec. 31, 1869	993½ tons, value	163,475
" "	March 30, 1870	1,457 tons, value	228,896
" "	June 30, 1870	2,397 tons, value	119,488
Total			$765,056

This is from the books of the county assessor, and as a tax is paid on the amounts returned, the numbers given may be relied upon as not exaggerated. E.

Coal Measures of Indiana.

From Mr. Cox's first Annual Report.

THE area of the coal measures in Indiana, which, in advance of a computation to be made from an actual detailed survey, may be stated to approximate six thousand five hundred (6,500) square miles, or one-fifth part of the entire State. Insignificant as this coal area may appear when compared to that of the whole United States, which has been estimated at 130,000 square miles; it is, nevertheless, more than half as large as the entire coal area of Great Britain and Ireland.

The carboniferous period is usually divided into two epochs—mill-stone grit, or conglomerate, and coal measures; the latter being again, sometimes, subdivided into lower and upper coal measures; but I can find no necessity for or evidence to sustain this subdivision, either in Kentucky, Illinois, or Indiana—the upper or barren coal measures of OWENS's Kentucky reports being nothing more than a repetition of his lower coal measures seen at localities where, from local causes, the coals are of less thickness, or are entirely wanting, and their places are occupied by shale or other mineral matter. The millstone grit epoch lies at the base of the coal measures, and is usually represented by a massive sandstone that is nearly always charged with quartz pebbles, varying in size from a buckshot to that of a quail's egg. Though good thick beds of workable coal are found below this conglomerate in Indiana, Kentucky, and elsewhere in the United States, they are of rare occurrence in England, and the miners of that country have consequently given to it the name of "Farewell rock." From the geological position of the millstone grit, it becomes necessary that we should give it our especial study, from the fact of its forming an important horizon to guide the miner in his search after coal—a task that is by no means so easy as at first view might appear, for the massive sandstone, which forms its principal feature, is not everywhere a conglomerate—that is, charged with pebbles; and at very many localities its lithological character appears in no respect to differ from the massive sandstones which are to be found at a higher geological level in the coal measures. Nor will the proximity of a sandstone to the underlying carboniferous limestone, in the absence of other evidence, serve at all times for its identity, as the millstone grit may be entirely wanting, and its place represented by superior strata, resting on rocks of a much greater age. An example of the latter condition may be seen at La Salle, in Illinois, where the coal measures are resting on rocks belonging to the lower Silurian age.

The investigations I have made during the last three years in the Western coal fields have led to the discovery of great errors that exist in the reports of previous surveys made in the same district, at least so far as they relate to the coal measures of Indiana, Western Kentucky, and Southern Illinois.

In the third volume of the "Geological Report of Kentucky," pages 18 to 24, the coal measures are divided into two epochs, designated as *upper* and *lower* coal measures. The vertical section of the coals given in the above report is adopted entire in the subsequent report of a "Geological Reconnaissance of the State of Indiana," by Professor RICHARD OWEN, and an effort is made therein to have all the coal beds of Indiana conform to the arrangement of the coal beds as laid down in the Kentucky sections above referred to.

Now, from the best evidence, I feel authorized to say that this classification of the coals can no longer be retained, neither as regards the division of the strata into epochs nor in the number and order of the coal beds. What has been designated by OWEN and other geologists, in the district above referred to, as upper coal measures, turns out to be merely a repetition of the lower coal measures of the Kentucky section, seen where the shales have an increased thickness; and the beds of coal, elsewhere referred to as the lower coal measures, are either entirely wanting, or are reduced to a few inches in depth. Indeed, all the investigations I have been so far able to make go to show that it is only around the rim or margin of the western coal basin, and not throughout its central area, that we are to look for a succession of thick beds of coal. As we approach towards the central part of the basin, the coal beds which surround it are either entirely absent or have dwindled down to seams that are only a few inches in thickness, their places being occupied by a preponderance of argillaceous shale, some sandstone, and an occasional stratum of limestone.

The increased thickness and lithological character of the strata forming the central area of the Great Illinois coal field, with their paucity of coal, appears to point to the fact that their deposition took place in deep and quiet water, where the favorable conditions which prevailed so fully for the accumulation of carbonaceous matter in the shallower waters along the margin, were here not such as would admit of a luxuriant growth of plants, so essential for the formation of thick beds of coal. From numerous irregularities to be found in the coal measures, in many localities, we are further led to conclude that the bottom of the large marsh, or peat bog, in which coal beds were formed, was not an entirely level surface, but was subject to the same changes and inequalities that are to be found in the gr bogs of the present day; and that it was traversed by streams, both large and small, in such a manner as to cause an accumulation of carbonaceous matter in one locality, and cut it away in another. From this view of the subject, it is not at all strange that we should find coal absent in strata at some localities which are coal-bearing at others.

The conglomerate, and likewise other massive sandstones, are often seen charged with fragments of coal and stems of trees, as though the currents which transported the sand and gravel of which the rock is composed had, in some places at least, cut away underlying coal seams; and it may be observed, as a general rule throughout this coal field, that wherever the usual argillaceous or bituminous roof shales are absent, and the sandstone is found resting immediately on the coal itself, the latter will seldom show its normal depth, from the fact that a portion of the top part of the bed was swept away by the forces which brought in the sand, and in such cases it is not at all unusual to find in the sandstone an abundance of plant remains, such as *lepidodendra*, *sigillaria*, *calamites*, etc.

In the chronological arrangement of the Western coal beds, published in the third volume of the Geological Report of Kentucky, and subsequently adopted in the Report of a Geological Reconnoissance of Indiana, published in 1859, there is, in addition to the error of separating the productive and barren coal strata into separate epochs, a further misplacement of strata and duplication of coal beds below the "Anvil Rock" sandstone, which forms an important geological horizon in Western Kentucky and Southern Illinois. Commencing with No. 1, B, of the Kentucky section, which is seen at Cannelton, Ind., at Hawesville, on the opposite side of the river, and at Bell's and Casey's mines, on Tradewater river, a few miles to the eastward of Caseyville, on the Ohio river, in Union county, Kentucky, we have a generally recognized synchronism over a broad area of the coal measures for the first bed of coal above the conglomerate that is of sufficient thickness to be economically worked.

Now, assuming this coal bed to be correctly placed, there is, thirty or forty feet above it, a thin seam, No. 3, that is nowhere over the district mentioned thick enough to work. But the "Ice House" coal, No. 3, is the equivalent of No. 1, B, it having been mistaken for a higher coal. And the "Curlew" coal, No. 4. is the equivalent of No. 11. Being seen in the Curlew hill, near Caseyville, it was mistaken for a lower coal. The massive sandstone above the "Curlew" coal, designated as the "Mahoning sandstone," in the reports above referred to, is consequently nothing more nor less than the Anvil Rock sandstone seen at another locality.

In consequence of the magnitude of these errors, the usefulness of the Kentucky section is completely destroyed in so far as regards the synchronism of coal beds, and its adoption, long unquestioned in this State, has been productive of much confusion.

In advance of a more thorough study of the coal measures of this State, it is a matter of some importance to be able to decide upon a system of numbering that will not prove objectionable before the completion of the survey, and yet enable us to show at a glance, in each section, the equivalent beds of coal. For the present, therefore, I have thought best to omit the system of numbers, and adopt, instead thereof, corresponding letters for equivalent coal beds. By this means we may be able to construct, after completing the detailed survey of the coal measures, a general vertical section that will prove harmonious in all its parts.

Notwithstanding the amount of study that has already been given by geologists to the coal measures of the West, we are just beginning to clear away the errors of preconceived notions, and instead of building conclusions upon speculative theories, the theories themselves are being made to rest upon *bona fide* examinations and well authenticated facts. In tracing a seam of coal, it must be borne in mind that the quality of the coal in any given seam will seldom serve for its identity over any great extent of country, as in this respect it is subject to great variation. The same seam may be a free burning, hard, bituminous splint coal in one place, and a caking, highly bituminous, soft coal at another; nor will it do to rely upon the thickness of a bed of coal as a sure means of identity over any great extent of country, as in this it is also subject to great changes. A single coal bed seldom exceeds five or six feet in thickness; when of greater thickness than this it is apt to contain a parting of fire-clay, which tends to show that it is a double seam and liable, in other localities, to be separated by many feet of strata.

The efforts that have been made to identify the coal seams by the organic remains found in the roof shales, have also proved equally uncertain. In consideration of the above fact, we are led to the conclusion that the only sure way of tracing the identity of a coal seam over a great extent of country, is to pay strict attention to the study of all the accompanying strata.

Improvements in Segar Machines.

MANY attempts have been made by inventors to construct a machine for making segars, and large amounts of money and time have been spent to accomplish this object, but without success. Messrs. JOHN O. REILLY and ISAAC TEN EYCK, of this city, have patented, through the agency of WESTERN AND COMPANY, a machine for making segars, which is claimed to be a success. The nature of this invention consists in the employment or use of four rollers, upon which are closely-fitted moveable thimbles, made so as to be adjusted in any desired position upon the said rollers, for the purpose of forming any desired length or form of segar as may suit the manufacturer or consumer. These movable thimbles are adjusted by the thumb and finger, so that all costly and complicated mechanism for the purpose is dispensed with.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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The Uses of the Bessemer Metal.

WE recently finished the publication of an admirable article by Lieutenant DUTTON, on the manufacture of Bessemer steel. This article was thorough so far as it went, but as it did not treat particularly of the application of this product in the arts, we think that a few remarks on this head may not come amiss, in order to complete the subject.

In this country but little use has been made of the Bessemer metal, save for the manufacture of rails, while in Europe it has been successfully applied to many other purposes, among which we may mention boiler making, and the construction of many running parts of machinery. Evidently, as Lieutenant DUTTON declares, it has generally replaced wrought iron and not steel. The use of the misnomer steel has doubtless been the reason that this metal has not been applied to many purposes for which it appears to be better adapted than either cast iron, wrought iron, or steel. Cast iron and crucible steel, though they are harder than wrought iron, possess less tenacity; hence, for constructions intended to resist jars or strains, neither of these metals have of late years found any extended use. The only other metal formerly known possessed of sufficient tenacity for such purposes was wrought iron, which, in the course of time, has gained for itself so high a reputation that much prejudice has to be overcome before people will use anything else. In fact, iron-men are noted for their conservatism, and we readily admit that they ought to be conservative, when we consider the vast interests committed to their charge, often involving numerous human lives, as well as large amounts of money.

By the pneumatic or Bessemer process it is doubtless possible to make a metal resembling steel so closely that for many purposes it could be substituted for it. But in practice we find that what is actually made differs very widely from steel, and comes into competition rather with wrought iron. Let us keep this point fully in view, while we compare the relative merits of wrought iron and Bessemer metal. Everybody knows that it is impossible to handle very large masses of iron at once in a puddling furnace; and hence, if we want a heavy piece of wrought iron, it is necessary to weld together two or more blooms, in order to get it. It is also notorious that blooms are too likely to contain slag and other impurities, to be directly used in the manufacture of wrought iron articles. They must first be subjected to the process of hammering, drawing out, and welding.

However carefully the process of welding is conducted, there is always a possibility of leaving the welds imperfect, and hence the product, though externally perfect, is subject to flaws in the interior, which render it liable to fracture under strains which it ought to resist with ease. Bessemer metal, however, can be cast in ingots of five tons each, free from slag, and capable of being used directly for the manufacture of heavy articles. In this case, instead of flaws from imperfect welding, such as occur in wrought iron, we are liable to find defects in the form of bubbles. Practically, it has been found that bubbles are much more frequent close to the periphery of the ingot than nearer the centre, so that the external appearance of a Bessemer ingot furnishes us with a correct idea of its internal condition. It is, moreover, asserted that when bubbles occur in the interior, they are free from rust, and present clean metallic surfaces, which weld together perfectly when the ingot comes to be drawn out. A correspondent of the *Maschinen Constructeur* says that he has seen Bessemer metal used with great advantage for making the piston-rods of steam hammers which were used for hammering steel. Wrought iron pistons and piston-rods of the same dimensions were used up in a short time, by the change of the iron from a fibrous to a granular structure, in consequence of the repeated concussions to which they were subjected. Bessemer metal has also been used for locomotive axles with excellent results. Its use for this purpose, as well as for boiler plates, is continually increasing in Europe, though we have not yet heard of its application to either purpose in this country. The fact that it resists the oxydizing effects of a flame much better than wrought iron is a strong argument for its use in boilers. It is only about thirteen years since the first introduction of Bessemer metal, and though its adoption for rail-making has been contested, step by step, until it proved itself far superior to other iron, it is now almost universally commended for that purpose.

It is scarcely to be expected, however, that because its merits for rail-making has been recognised, its other uses will meet with no opposition. Boiler-makers, for example, who have been all their lives accustomed to the employment of wrought iron, will not discontinue to use it at once—though in the long run a superior material is certain of adoption. A large number of the boiler explosions, of which we hear so often, are doubtless due to the partial destruction of the iron by oxydation, in boilers which were originally equal to the task imposed upon them. This fact was fully proved in England, by evidence recently given before the committee appointed by Parliament to inquire into the cause of the alarming number of boiler explosions occurring annually in that country, and to suggest remedies. The sulphur contained in the soft coal, which is used almost universally in England, may cause the destruction of the iron to take place more rapidly there than it would in this country, where so much anthracite and wood are used. Still, this destruction is, in a great measure, due to the oxydizing effects of the flame, which Bessemer metal resists much better than wrought iron. So that the conclusions of the English committee are almost equally applicable to this country. This, in connection with its greater tenacity, would seem to recommend especially the use of Bessemer metal for boilers, and will doubtless lead, before long, to its experimental adoption for that purpose in this country.

Pennsylvania Mine Inspection.

WE have received the Report of the Inspector of Mines of the County of Schuylkill, Penn., for the year ending December 31, 1869. Mr. JOHN ELTRINGHAM occupies this position at present, under the State law for the better regulation and ventilation of mines and the protection of the lives of the miners. The object of the law was a wholesome one; and Mr. ELTRINGHAM's activity during the year appears, from his report, not to have been without good results. The document itself, moreover, contains a considerable amount of interesting matter. There are detailed tables concerning some one hundred and thirty-eight different collieries, giving their names, locations, owners, operators, the number of Mr. ELTRINGHAM's visits to them, the number of miles travelled for each visit, the age of the collieries, the outside and inside temperature, the particulars of beds and of mining works underground, the breasts, the method and power of ventilation, engines, boilers, grates, wire ropes and chains, planes inside and outside, tracks, T-rails, (miles, tons and cost,) percentage of gases, shipping power and force employed, casualties and general remarks. If this list appears to be strangely arranged, it is not our fault. We copy the head-lines of the tables in the order in which they stand.

Now all this information would be very valuable if trustworthy, and a good deal of it is no doubt trustworthy. The trouble is to find out what to accept and what to reject. The honesty of the Inspector we do not question; but his incapacity, perhaps in making observations, certainly in reporting them. The first requisite in such a report is an accurate use of the English language. This is even more important than a knowledge of the subject; since even a man's ignorance of facts will do little harm if it is clearly expressed in words. Mr. ELTRINGHAM's style is so illiterate, ungrammatical and obscure, that it leaves us in doubt whether knowledge or ignorance is hidden beneath. On page 7, he says that the common name of gas "still retains to designate areoferous substances," under which he includes "carburated acid gas," or fire-damp! A little further on is the following tit-bit :

"Dr. PRIESTLY collected and rendered easy the handling of gases and gaseous substances. He also isolated different sorts of gases, and among them oxygen gas. A Mr. SHEELE, a native of Sweden, discovered three more gases, and discoveries followed in rapid succession all over Europe. Mr. CAVENDISH found hydrogen gas; Mr. RUTHERFORD found nitrogen; *while Mons.* LAVISIOR *overthrew all opinions, by proving that it consisted only of two gases, mingled in unequal proportions. But a recent discovery proves, and it has been admitted as a fundamental principle in physical science, that gases are merely steam, which boil at immensely low temperatures,*" etc., etc.

In spite of the strong testimony of several pages of such stuff as this, we do not think Mr. ELTRINGHAM is an idiot, though he might as well be one, for all the impression his general remarks will produce on intelligent readers. But when he comes to minute descriptions of the different collieries, he is a little more at home. His style is no better, perhaps; but its eccentricities are not so awfully funny, when confined to brief statements of dimensions and numbers. Still, he is as ingenious in the misuse of signs and figures as of words. On page 38—one example out of some hundreds—he expresses the section area of a slope as "16+14+10 = 150 square feet;" on page 46—also a representative case—a similar quantity is expressed as "4×5×4 = 18 square feet;" on page 29 we are told of "19 boilers, 34 inch + from 20 to 30 feet long = 484 feet."

This unfortunate originality in the use of symbols makes it difficult to find out what the author means. He generally does mean something, however, and it is generally to be discovered by patient application. Then, alas! comes the irritating discovery that this secret treasure was not worth delving for. Thus we were deluded into some calculations upon the figures on pages 27 and 29 concerning the boilers and engines of two collieries. The result gave us, at the St. Clair colliery, (page 27) less than three square feet of heating surface of boiler per horse-power, and 3.4 horse-power per square foot of grate-surface. At the Wadesville colliery (page 29) we have 3.2 horse-power per square foot of grate-surface, and 2.74 square feet of heating surface per horse-power. The usual practice requiring at least one square foot of grate-surface, and from nine to fifteen square feet of heating surface, per horse-power, it is evident that Mr. ELTRINGHAM has committed errors of observation or of statement which render these dimensions, according to his report, less by two-thirds than they ought to be. This conclusion is corroborated by the blunder on pages 27 and 28, by which the pump at the St. Clair colliery is put at 500 horse-power, when its dimensions (assuming it to make 10 strokes a minute, under a mean pressure of 30 pounds of steam) give only 360 horse-power.

This is the character of the report throughout. It is a disgrace to the State, the State printer, the proof-reader, and the author. Mr. ELTRINGHAM may have the necessary practical experience to make him a judicious inspector, in spite of his views on "aeroferous substances," and his confusion of the Greek cross with that of St. Andrew and St. Patrick, in their non-ecclesiastical uses as signs of multiplication and addition. But he ought to have an assistant who can modestly correct his ideas, his style, his mathematics, his grammar and his spelling, before they are put forth under the broad seal of the Commonwealth of Pennsylvania. His sympathies seem to be where his accomplishments would naturally put him. He identifies himself in opinions, as in manners, with the laboring miners—among the most ignorant classes in this country; and on page 15 he says "the very remarkably settled state of society which is developed under the new institution of the Workingman's Benevolent Association and the operators' committee, is bringing about very beneficial results—a blessing the country never enjoyed before." The "very remarkably settled state of society" speedily bred a nine months' strike; and that swindling tyranny, the Workingman's Benevolent Association, was at the bottom of it. Mr. ELTRINGHAM either knew the real state of affairs or he did not. Would it not be well, in the first instance, to dismiss him as a demagogue, and, in the second, to drop him as a dunce? We may be mistaken; but we fancy there are men in Pennsylvania who would fill this office without bringing it into contempt.

Water in Cities.

A CORRESPONDENT of the New Haven *Journal and Courier* proposes to use the tide as a power for raising sea water to a large reservoir, from which it could be distributed for sprinkling the streets, extinguishing fires, and even for providing mechanical power. He says :

"To make such power available, what needs there more than a broad wheel, its journals suitably supported by solid piers, the wheel, say, half as broad as the river, and the current for a short distance narrowed to the breadth of the wheel, which may be set to take the greatest force of the current, and be connected with pumps of a capacity adapted to its power? Right over here, in Fair Haven, might not such a wheel be established, say between the two bridges, and thus pumping from the never-failing supply of water, charge spacious reservoirs upon the Fair Haven hills? And if one such tide-wheel be not adequate for the uses we have indicated, cannot its power be multiplied at every tidal inlet around our bay and harbor?—and if yet more power be wanted, is there not also an ocean of air which has its currents too? 'But those currents are irregular.' Yes, but may they not be auxiliary? Have we not heard of single wind-mills, in Holland, whose lifting power will discharge several million gallons of water in every twenty-four hours of gentle wind? Is there, then, anything incredible in this, that with tide-wheels and wind-wheels together, if not with tide-wheels only, an abundant supply of water may be provided from a source which droughts do never diminish: Or, if yielding something of our claims, we should put the case thus: That, not to say unlimited, but a very extensive, and even vast power, can be thus cheaply provided for mechanical uses only, would it not be a grand acquisition for any city—would it not more than double our population in less than one decade?—affording the means of comfortable livelihood for many times our present numbers?"

On this plan a correspondent desires our opinion. The thing seems to us not impossible, but at the same time not economical nor feasible. In the first place, the motion (and hence the power) of tides is deceptive. The tidal wave is an optical illusion. The successive particles of water rise and fall vertically, seeming to move in a strong current forwards, while they do not progress in a corresponding ratio. The actual power of the tide for such a purpose as is above indicated would be measured only by the amount of water flowing into a bay or river and out again, daily. This water, it will probably be found on calculation, gives but small chance for the economical application of an undershot wheel. The notes of the Coast Survey, which we have not now at hand, would give the means for an exact calculation. In the second place, the transmission of salt water through pipes would be difficult and expensive, and the uses of salt water are comparatively few. It may extinguish fires better than fresh water; but it is not yet certain that it would be equally suitable for flushing the streets. As for furnishing mechanical power, it could not furnish so much, in the aggregate, as the power of the wheel employed to raise it. The additional use of wind-mills might effect a gain; but it would be still better to apply the wind-mills directly for small mechanical operations.

The use of such a wheel as above described would effectually

close the stream to navigation of all kinds. It would affect the currents and shallows below as well as above it, and might thus do serious damage to harbor properties. Finally, if the cost of a reservoir and of distributing pipes is to be incurred, it is best to employ them for the collection and distribution of fresh water, fit for washing, drinking, and cooking. The correspondent above quoted says in the same letter :

"Is it not almost certain that there do exist abundant sources of water supply, and, by a natural flow, to be obtained from the interior of our little State? Within twenty or thirty miles of New Haven are there not lakes of purest water, two hundred feet above our level, from which, through an open cut, the water may be conducted to reservoirs on the heights, two or three miles from our city, and thence be distributed in pipes? And here and there, into the same open cut, along its route, may there not be available confluent tributaries enough to replenish the losses by use and waste?"

It will be time enough to draw on the inexhaustible but not undefiled treasures of the sea when the growth of New Haven has made it impossible to supply her from the accumulations and overflows of the land.

New Publications.

ROASTING OF GOLD AND SILVER ORES AND THE EXTRACTION OF THEIR RESPECTIVE METALS WITHOUT QUICKSILVER. By G. KUSTEL, Mining Engineer and Metallurgist. San Francisco : DRURY & Co, (Scientific Press), 1870. Price, post-paid, $3 currency.

THE publication of this practical and timely little treatise is due, as the author informs us in the preface, to the many inquiries made of him concerning the leaching, solution and precipitation process for silver ores, and successfully practised in Sonora by Mr. OTTOCAR HOFMANN. This process was the invention of Mr. KUSTEL, and has been described by him, as our readers will remember, in the ENGINEERING AND MINING JOURNAL. But, in order to explain the process clearly, and describe its manipulations so as to furnish rules for its successful operation, he has found it necessary to discuss at considerable length the preliminary roasting, upon the skillful execution of which its results depend. In this way he has been led in the present work to survey the whole field of roasting operations, and thus we have in small compass, liberally illustrated and clearly expressed, the views of one of our most respected veteran metallurgists on a topic vitally connected with our metallurgical industry. The following abstract of the contents of the book gives a comprehensive view of the subjects treated. It is a duodecimo of 142 pages, and a marvel of condensation and simplicity, and directness in style :

I. INTRODUCTION.

Classification of Ores; Important Silver Ores; Difference Between Real Silver Ores and Argentiferous Ores; Important Combinations; Means of Desulphurization; Means of Reduction; Desulphurization of Ores Not Efficient; What a Chloride is, and How Chlorination is Effected; Means of Separating the Metals from Chlorine.

II. ROASTING OF ORES.

A. Chloridizing Roasting; Necessary Amounts of Sulphurets; Amount of Salt Used; Permanent Stirring not Essential; Signs of a good Chloridizing Roasting; Means of Destroying Base Metal Chlorides; Steam Decomposes Base Metal Chlorides; Application of Steam in Roasting; Lead has a Bad Influence; Difference in Roasting Processes; In what Condition the Metals are after Roasting; Charges in Roasting.

B. Oxidizing Roasting; Chemical Changes in Roasting; What Process requires Oxidizing Roasting; Roasting Furnaces; Furnaces managed by Handwork; Reverberatory Furnaces; Single Roasting Furnace; Double Roasting Furnace: Long Roasting Furnace; Muffle Furnace; Furnaces with Mechanical Apparatus; Revolving Hearth Furnace; Ernst's Rotary Furnace; Parke's Furnace; Buckner's Furnace; O'Hara's Chain Furnace; Stetefeldt's Furnace; Chimneys and Flues.

III. EXTRACTION OF SILVER BY LIXIVATION.

C. Solving Process; Extraction of Silver; Precipitation of the Silver; Treatment of the Precipitated Silver; Precipitation of Copper; Quality of Ores fit for the Solving Process; Sulphide of Calcium; Hyposulphite of Lime; Patera Process; Kiss Process; Patera and Roszner Process; Kustel and Hofmann Process; Augustin Process; Ziervogel Process; The Leaching Process.

IV. EXTRACTION OF GOLD.

D. The Chlorination Process (Plattner's); Chlorination of Sulphurets and Arseniurets.

The reputation of Mr. KUSTEL as a scientific and practical metallurgist already established by his earlier works on "Nevada and California Processes," and "Concentration and Chlorination," will be confirmed and augmented by this excellent treatise.

Mining in Oregon.

FROM a correspondent in Baker City we learn that the Runkle is doing very well, running night and day, and though the returns are kept private, it is certain that they are crushing good rock and making money. The company are also sinking the shaft on this lode twenty-five feet, for the purpose of starting a new level. New diggings have been struck on Burnt River, between Express Ranch and Snake River. A considerable number of men are employed there, and the work promises well. A Chicago party are at Eldorado, a rich placer camp, but devoid of water. The Chicagoans are negotiating for the purchase of the CARTER and PACKWOOD ditch, which they intend to employ for bringing the water of Burnt River to the placers. From June 10th to August 8th, $97,359 in gold dust, bullion and coin were shipped from Baker City.

One of WELLS, FARGO & Co.'s coaches was robbed on the evening of August 17th, three and a half miles this side of Umatilla. The robbers did not get much, and Old FARGO is after them.

Geological Survey of San Domingo.

WE are pleased to learn, from an announcement of the Secretary of the Interior of San Domingo, that the geological survey of that island is progressing satisfactorily under the supervision of Professor GABB, who was formerly engaged in the California State Survey. Scientific information of an interesting character is being rapidly attained, and it is hoped that the further examination will lead to such exact knowledge of the mineral wealth of the island, that capital and enterprise may soon flow in from abroad to develop valuable mines.

Marine Engines.

THE marine engine is now undergoing a process precisely akin to that known in certain circles as a "revival." It underwent a similiar process about ten years ago. It is the usual fate of revivals of all kinds that no lasting or permanent good comes of them. No good worth naming was done at the moment to steam navigation by the revival ten years ago. It remains to be seen whether the results of the revival of to-day will be more satisfactory. There is reason to hope that they will, because the enterprising practice of the engineers of to-day is based in a great measure on the experience afforded by the enterprising practice of engineers ten years ago, from which a great deal is to be learned. We enjoy advantages, therefore, which are peculiar to 1870, and had no existence in 1860. But the fact still remains that experience alone will not teach any engineer how to effect improvements in marine engines. It will enable him to apply theory based on fundamental natural laws to the best possible advantage, but it cannot compensate for a want of knowledge of these laws; nor can it enable results to be obtained in direct opposition to them. So far, therefore, as improvements in marine engines now being introduced are based on sound theory, and applied with a strict attention to the lessons of experience, are they likely to be successful, but no further. It follows that the questions of paramount importance to the marine engineer are questions of the applicability of the teachings of theory in practice. The art of reconciling the two in the best way represents one of the very highest developments of engineering science. Now, it is certain that little, if anything, was done to improve the marine engine ten years ago which was not based on the soundest theoretical deductions. It is demonstrably right to expand steam as far as possible. It is scientifically correct to supply a boiler with distilled water instead of salt. No engineer—using the word in its highest sense—would object to the axiom that steam should be thoroughly dried by the evaporation of suspended particles of water before it finds its way to the cylinder. Nevertheless, when expansion, surface condensers, and superheaters came to be applied to the marine engine some ten or twelve years ago, it was found that they were one and all failures. There is no necessity for mincing matters. They all failed, and they all cost those who tried them heavy sums for their temerity. But they did not fail because they were intrinsically defective. They failed because they were used without experience. We will not say that expansion, and superheating, and surface condensation are now being reintroduced after a more or less prolonged abandonment, because they have always been in modified use since they were first introduced. But we can say with perfect truth that they are now being used by some engineers in a way which, although contemplated by their inventors or proposers, was not found to succeed some years ago. Thus we have not only an increasing tendency to use higher pressures than were formerly found to answer, but we have that tendency developed into actual operation. The same thing may be said of high measures of expansion, quick piston speeds, and, perhaps, of superheating. If these things are used in certain ways we know that they will fail now, as they have done already, to constitute improvements in marine engineering. It remains to be seen whether a happier result can be obtained by using them in a somewhat different way, in the first place; and, in the second place, whether this use in a different way will or will not impair their efficiency.

The questions thus opened up deserve the most serious attention of all mechanical engineers, whether engaged in marine engine building or not, because the steam engine is common to all mechanical engineers and much that is true of the land engine will apply to the marine engine, and *vice versa;* so that the maker or designer of land engines may not only learn a great deal from the marine engineer, but impart a great deal of information in return. The best way of arriving at sound conclusions on any subject is to learn all that can be said about it by good authorities. It is to be regretted that shipowners and engineers have hitherto proved far more reticent on all that concerns their work, than the general public will easily believe. There must, no doubt, be a great mass of information floating about as to the construction and working of the best marine engines and boilers which has never yet seen the light, in the shape of paper discussion, books, or even pamphlets. Perhaps, one of these days a lot of it will be all collected and published, and the scientific world will then be in possession of what is sadly wanted, a thoroughly good work on the marine engine. Meanwhile we hail with no little satisfaction the publication, however limited, of any practical paper on steamship economy dealing with questions concerning it as things are, not as things were; and we find just such a paper in the twenty-ninth volume of the "Transactions of the Institution of Civil Engineers," in the shape of a paper "on Ocean Steam Navigation," read by Mr. JOHN GRANTHAM, C.E., last December, and the discussion which followed it. Paper and discussion are alike full of valuable information. We are very sorry that they are not generally accessible. An attempt to abstract Mr. GRANTHAM's paper, or the discussion which followed it, would do scant justice to both; but there are certain lessons conveyed which are highly instructive on several points, and admit of reproduction here.

One of the most important facts to be borne in mind in dealing with the subject of steamship economy is, that the ship which performs a given voyage with the smallest expenditure of fuel and the largest paying load is, to all intents and purposes, the best ship that can be got. It is a mistake, however, to jump to the conclusion that the ship whose engines use the least coal must of necessity make the cheapest voyages. More, very much more, depends on the ship and the method of propulsion adopted than upon the engines. Thus, by merely cutting a ship in two, and lengthening her some thirty feet or forty feet, her paying cargo capacity has been doubled without in any way affecting the cost of propulsion, or prolonging the duration of her voyage. The engineer when speaking to the shipowner, seldom hears much about consumption of coal per indicated horse-power, but he hears a great deal indeed about the consumption per voyage. Economy of fuel per horse-power is one means to the desirable end; but it is not everything, and we lay considerable stress on this fact, because there is no doubt that eminently economical engines, from being improperly put to work in badly designed boats, have completely failed to give satisfaction; the cost of such engines per voyage being considerably in excess of the cost of much worse engines placed in better boats and working under more favorable circumstances. The engines have been deemed the culprits, and really valuable improvements have been hastily condemned as failures. The existence of this truth was evidently fully recognized by both Mr. GRANTHAM and his hearers, but there was not so much said on the subject as was desirable. All the speakers were agreed, however, that great length, in proportion to beam, was absolutely essential to economy. The truth of the proposition is demonstrated by the practice of the best builders of the day.

Although steam engine economy does not alone secure steamship economy, it conduces powerfully to that desired end; and it was to be expected that, considering many of the circumstances under which the paper was read, not a few instances of extraordinary economy of fuel would have been cited. The high character of the Institution, however, no doubt operated beneficially, and not a single speaker ventured even to hint at the wonderful tales sometimes told before less eminent societies, and less able judges of their truth or falsehood. On the contrary, the meeting evinced a general tendency to disbelieve in any statement of excessive economy. The advocates of the compound engine, one and all, spoke of the system. We were pleased to find, in much the same qualified terms of praise as we have ourselves bestowed on the principle of combination when applied to marine purposes. We especially commend to attention the opinions expressed by one of the speakers, himself a member of one of the largest and most enterprising firms of shipowners in the kingdom. He stated that he had given a great deal of attention to the question of steam navigation, more especially to the indicated horse-power developed at sea, and had come to the conclusion that shipowners greatly overestimated the power actually evolved, and consequently underestimated the consumption of fuel. On this point we have long held similar opinions, as in no other way can the extraordinary results said to have been attained under certain circumstances, be accounted for. The speaker stated that from the best returns he could get, he had arrived at the conclusion that in most of the steamers which performed their voyages at high speeds the consumption was 2¾ lbs. of coal per horse-power per hour, and it was not till the speed was reduced to 8½ or 9 knots per hour that a consumption of 2½ lbs. was reached. It is quite possible that such a statement will be disputed, and it is, therefore, well to place before our readers figures either given by Mr. GRANTHAM or by his hearers, bearing on the question. The Rakaia, built by Messrs. RANDOLPH, ELDER & Co., for the Colonial Steam Navigation Company, of New Zealand, is 265 feet long, 34 feet beam; draught, loaded, 21 feet. Her engines are compound, the two large cylinders being 87 inches, and the two small cylinders 43 inches in diameter, by 4 feet 3 inches stroke, geared; 27 revolutions of engines per minute to 67 of screw. The consumption of fuel is taken by Mr. GRANTHAM to be 2.13 lbs. of coal per horse per hour, but he does not give the indicated horse-power as more than an assumption. The Somersetshire, one of Messrs. WIGRAN's ships, burned, at a low speed, 2.36 lbs. per indicated horse-power with ordinary engines, 20 lbs. steam, surface condenser and superheater, indicated power 650 horses, displacement about 3,900 tons. Mr. STEPHENSON spoke of a steamship which, on her first voyage to China and back, burned only 2 lbs. per indicated horse-power. Mr. RAVENHILL stated that the consumption of fuel by the engines of the Peninsular and Oriental Company averaged 2.4 lbs. to 2.5 lbs. per indicated horse-power per hour. These are nearly, if not quite, all the instances in which the consumption per horse-power was cited. And although there are dozens of figures giving the total consumption per day the speakers either could not or would not give the indicated horse-power. Mr. BRAMWELL gave an admirable example of the way in which inaccurate statements concerning economy of fuel at sea are put in circulation. The example was supplied by Mr. GRANTHAM himself. That gentleman stated in the course of his paper, that the Peru, a vessel fitted with compound engines of 350 horse-power nominal, worked in running light from Glasgow to Liverpool up to 1,400 horse-power indicated, her speed being fourteen knots; the consumption of fuel not stated. He then went on to say that the Peru took in cargo, and the result of a voyage into the Pacific and back was that she burned 24 tons 1 cwt. of coal per day, which, using 1400 as a divisor, Mr. GRANTHAM took to represent 2 lbs. per horse per hour. But instead of the revolutions of the engines being the same as on her first trip when light, they corresponded to a speed of but 9.8 knots, which should be obtained with 410 horse-power if the draught remained unaltered. But even allowing for the cargo, it was quite certain that nothing like 1,400 horse-power was regularly developed, and the consumption was, therefore, more properly 4 lbs. per horse than 2 lbs.

When we find careful, impartial authorities like Mr. GRANTHAM falling into such a fallacious mode of reasoning as this, what can we expect of men who, however honest, cannot well help deceiving themselves? Not a single instance has ever come under our knowledge in which a complete and accurate set of diagrams has been taken over a series of years in any marine engine-room, without proving that not only is the power developed over-rated almost from the first, but that it goes on decreasing to the end, as the boilers become foul or worn out. A chance indicator diagram taken, say, once in a

watch, when the pressure of steam is highest and the engines doing best, is, as a rule, taken to represent the power exerted on the average during a whole voyage, not the slightest allusion being made to the pulling up of the engines by a head wind or a heavy sea. It is to the last degree desirable that makers of eminently economical engines should take the trouble of producing for the benefit of the scientific world the most complete statements of the indicated horse-power of the engine on long voyages. When they refuse to do this, it is safe to assume that the conclusions of the users are based on insufficient data.

We have said so much concerning current evidence of economy in marine engines, that we have not left ourselves space to deal at present with many other interesting features of Mr. GRANTHAM'S paper. After all we are disposed to doubt the existence of any matter of more importance, connected with steam-engine economy, than the basis on which statements of engine builders and ship owners, concerning certain types of machinery, rest. When it is borne in mind that a difference of 0.1 lb. of coal per horse-power per hour will, in the case of the steamships plying between England and the United States, represent a saving of £2000 a year to the owners for a weekly service each way, it will be seen how important it is that the public should be placed in possession of not only the most complete, but the most reliable information. Whether it is or is not possible to ascertain with some degree of certainty exactly what the indicated horse-power exerted throughout a long voyage is, we are not prepared to say; but it is quite clear that until such evidence is placed before us, all statements concerning abnormally small consumptions of fuel must be looked on by sensible men with extreme doubt.—*Engineer.*

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107,433, antedated September 10, 1870.—POTATO DIGGER.—Sherman E. Anthony, Stillwater, N. Y.
107,434.—HYDRANT.—William Bailey, Troy, N. Y.
107,435.—MACHINE FOR DRESSING TILES.—George Barney, Swanton, Vt., and Valentine G. Barney, Minneapolis, Minn.
107,436.—SEED AND GUANO DISTRIBUTER.—Edward Blacklidge, Abbeville, Ala.
107,437.—SELF LOCKING HINGE.—Gustavus Emil Boisselier, St. Louis, Mo.
107,438.—BOLT CUTTER.—James R. Brown, Cambridgeport, Mass.
107,439.—SEAT FOR ROW BOATS.—Walter Brown, Boston, Mass.
107,440, antedated September 14, 1870.—STREET INDICATOR FOR CITY CARS.—William Brown, Duncannon, Pa.
107,441.—SOLAR CAMERA.—Norman Bryan, Thomaston, Ga.
107,442, antedated September 5, 1870.—TOY GUN.—Edward Buckman and Alexander Buckman, Brooklyn, N. Y.
107,443.—WASHING MACHINE.—Edmund L. Bullock, Hartford, Conn.
107,444.—HOISTING-GRAPPLE.—John A. Burgess, Plymouth, Mass., assignor to himself and Joshua Standish, same place.
107,445.—BROOM CORN SEED STRIPPER.—George E. Burt and Edwin A. Hildreth, Harvard, Mass.
107,446.—CLOTHES BASKET.—Leander Carman and Alexander C. Carman, McCoy's Station, Ohio.
107,447.—REMOVING BURNS FROM WOOL.—Peter Casson, San Francisco, Cal.
107,448, antedated September 10, 1870.—SAP FEEDER TO SUGAR EVAPORATORS.—George D. Chandler, West Concord, Vt.
107,449.—FRUIT JAR.—Thomas A. Clark and Henry C. Mascroft, Worcester, Mass.
107,450.—SHAVING MUG.—Frank B. Clock, Boston, Mass.
107,451.—EARTH CLOSET.—Lewis G. Clark, Manchester N. H.
107,452.—SECURING HUBS TO AXLES.—George E. Clow, Jeffersonville, Ind.
107,453.—BALANCED SLIDE VALVE.—Orrin Collier and William Henry Masterman, Sacramento, Cal.
107,454.—KNITTING MACHINE.—Francis M. Comstock, Cleveland, Ohio.
107,455.—FOLDING OR KNOCK DOWN CHAIR.—John K Coolidge and Nathan H. Hill, Cincinnati, Ohio.
107,456.—HORSE HOE.—Ira Copeland, North Bridgewater, Mass.
107,457.—CORN PLANTER.—Joseph Cosand, Russiaville, Ind.
107,458, antedated September 10, 1870.—SOLDERING MACHINE. Edward T. Covell, Brooklyn, N. Y.
107,459.—DEVICE FOR BALANCING FANNING MILLS SHOES.—Wm. Crane, Milgrove, Ind.
107,460.—SIGNAL BOX FOR FIRE ALARM TELEGRAPHS.—Sylvanus D. Cushman, New Lisbon, assignor to the Automatic Fire Alarm Company, Leetona, Ohio.
107,461.—COMBINED HARROW AND ROLLER.—Frank A. Dann and James McCiboen, Wellsville, Mo.
107,462.—CARRIAGE BRAKE.—Hiram B. S. Davis, Farmington, Me.
107,463.—EXTENSION TABLE AND SETTEE.—Martin Debzell, Wabash, Ind.
107,464.—CHURN.—Levi Dederick, New York, N. Y.
107,465.—ELECTRIC GAS LIGHTING APPARATUS.—Charles N. Ealer, Opelousas, La.
107,466.—MEAT CHOPPER.—John A. Eberly, Realmstown, Pa., assignor to himself and Abraham Godshalk, same place.
107,467.—SEED PLANTER.—Clement R. Edwards, Bowling Green, Ky.
107,468.—FOLDING SASH-WEIGHT.—William Ferguson and J. Anderson, New York, N. Y.
107,469.—IRONING-BOARD.—Jacob Fischer, Pittsburg, Pa.
107,470.—WASHING-MACHINE.—Charles Ford and Frank C. Garbutt, Mason, Ill.
107,471.—PROPELLER.—John D. Ford, Baltimore, Md.
107,472.—LOCOMOTIVE.—William A. Foster, Fitchburg, Mass.
107,473.—BUNG.—Vincent Fountain, Jr., West New Brighton, N. Y.
107,474.—MECHANICAL HAND-MOTOR.—Harvey Fowler, Washington, D. C.
107,475.—MECHANICAL HAND-MOTOR.—Harvey Fowler, Washington, D. C.
107,476.—BOX-STEREOSCOPE.—Thomas Fugate, Cincinnati, Ohio.
107,477.—COOKING APPARATUS.—John Gallagher, Cleveland, Ohio.
107,478.—LUBRICATOR.—John Gates, Portland, Oregon.
107,479.—COMBINED DRESSING BUREAU AND BATH-TUB.—Jane E. Gilman, Hartford, Conn.
107,480.—patented in England, December 17, 1866.—APPARATUS FOR DECORTICATING, SEPARATING, AND DRYING GRAIN.—Anton J. Glas, London, England.
107,481.—PLOW.—Charles M. Gordon, La Porte. Ind.
107,482.—SHIELD FOR CARRIAGE-STEP.—C. H. Gould, Boston, Mass., assignor to himself and William Lamb, same place.
107,483.—FIRE-PLACE GRATE.—J. Hackett, Louisville, Ky.
107,484.—CULTIVATOR.—Jamer H. Hamilton, Stevenson, Ala.
107,485.—SNOW-PLOW.—Robert Carr Harris, Maple Green, New Brunswick.
107,486.—GRAIN-SCOURER.—Isaac N. Harshbarger, Bloomington, Wis.
107,487, antedated September 12. 1860.—HARVESTER.—Andrew J. Haswell and John W. Irwin, Circleville, Ohio.
107,488.—WASHING-MACHINE.—Peter Hayden, Pittsburg, Pa.
107,489.—COMPOSITION FOR PAVEMENT.—Joshua R. Hayes, New York, N. Y.
107,490.—PREPARATION OF COMPOSITION FOR PAVEMENT.—Joshua K. Hayes, New York, N. Y.
107,491.—SHOEMAKEE'S EDGE PLANE.—Arthur P. Hazard, North Bridgewater, Mass.
107,492.—ADJUSTABLE ARMS FOR WORKING SLIDE VALVES.—Hubbard Hendrickson, Red Bank, N. J.
107,493.—STAND FOR CLEANING WINDOW.—Edward Herdster, Chicago, Ill.
107,494.—EXTENSION LOUNGE.—Nathan H. Hill, Cincinnati, Ohio.
107,495.—SMOKING-PIPE.—Charles F. Hitselberger, Libertytown, Md.
107,496.—KILN FOR BURNING TILES, PIPES, &c.—John Hornsby, Woodbridge, N. J.
107,497.—WAGON-HUB.—Jerome B. Hubbell, Naugatuck, Conn.
107,498.—SASH-HOLDER.—Henry C. Hunt, Amboy, Ill.
107,499.—LIFE-PRESERVING MATTRESS.—Joshua Hunt, Providence, R. I.
107,500.—COMPOUND MACHINE FOR UPSETTING, PUNCHING, AND CUTTING METAL.—William Hunt, Oskaloosa, Iowa.
107,501.—DEVICE FOR OPERATING HAND FAN.—William A. Ireland, New York, N. Y.
107,502.—PLANING MACHINE.—Anson Judson, Brooklyn, N. Y.
107,503.—MUD AND ORE MILL.—John Kellet, Elizabethport, N. J.
107,504.—VALVE GEAR FOR STEAM PUMP, ENGINE, &c.—John C. King, New York, N. Y., assignor to himself, George M. Woodward, and George A. Blood, same place.
107,505.—BALANCED ROCK VALVE.—John C. King, New York, N. Y., assignor to himself, George M. Woodward, and George A. Blood, same place.
107,506.—HARROW TEETH.—Henry R. Kinney, Portsmouth, Ohio.
107,507.—CASTER.—Joseph Kintz, West Meriden, Conn., assignor to himself and P. J. Clark, same place.
107,508.—CORN PLANTER.—Martin L. Kissel and Jacob B. Kissel, Springfield, Ohio.
107,509, antedated September 8, 1870.—BEDSTEAD AND COT.—Hermon W. Ladd, Chelsea, Mass.
107,510.—THRASHING MACHINE SEPARATOR.—Isaac Lebo, Winterville, Pa.
107,511.—LOCOMOTIVE ATTACHMENT.—Clark Lewis, Cassville, N. Y.
107,512.—BOLTING REEL.—Fitch B. Lewis, Tiffin, Ohio.
107,513.—TURNING LATHE.—Harvey Locke, Grand Rapids, Mich.
107,514.—LAMP.—George Henry Lomax, Somerville, Mass.
107,515.—EGG BEATER.—Thomas Marsh Pawtucket, R. I., assignor of one half his right to James Callaghan, same place.
107,516.—FRUIT AND VEGETABLE SLICER.—William A. Mayhew, Peabody, Mass.
107,517.—HEDGE TRIMMER.—Joseph McAnulty, Bentley, Ill.
107,518.—CLOTHES WRINGER.—John McLaughlin, Steubenville, Ohio.
107,519.—MUSIC LEAF TURNER.—James W. Mellor, Philadelphia, Pa.
107,520.—CORN PLANTER.—William M. Meyers, New Brunswick, N. J.
107,521.—MILK CAN.—John C. Mulligan, Brooklyn, N. Y.
107,522.—HARVESTER DROPPER.—Thomas C. Moore, Dublin, Ind., assignor to himself and Joshua G. Wickersham, same place.
107,523.—EVAPORATING SALT WATER AND OTHER LIQUIDS.—Franklin A. Moore, Syracuse. N. Y.
107,524.—DOUBLE PISTON ENGINE.—Albert W. Morrell, Nile, Mich., assignor of one-half his right to Percy Hale, Jr.
107,525.—FOLDING CHAIR.—William Morstatt and Francis Kips, N. Y., Francis Kips assigns his right to William Morstatt.
107,526.—CULTIVATOR.—John Neff, Jr., Pultney, N. Y.
107,527.—FLOOR CLAMP.—David Nettleton, Humbird, Wis.
107,528.—HAME FASTENING.—Sinclair D. G. Niles, Helena, Arkansas.
107,529.—DITCHING-MACHINE.—Ralph Robert Osgood, Troy, N. Y.
107,530.—TRACK RAIL FOR SLIDING DOORS.—Emory Parker, New Britain, Conn.
107,531.—HAY FORK AND HOOK.—Thomas W. Pierce, Minneapolis, Minn.
107,532.—ANIMAL TRAP.—Lionel Vernon Percival and Joseph Link, United States Army; said Percival assigns his right to said Link.
107,533.—FENCE.—Lester Philips, Eau Claire, Wis.
107,534.—MANNER OF MOUNTING HOLLOW REVOLVING CYLINDERS. Leman B. Pitcher, Salina, N. Y.
107,535.—PROCESS AND MACHINERY FOR MAKING MORTAR.—Leman B. Pitcher, Salina, N. Y.
107,536.—WAGON BED.—William H. Porter, Brazil, Ind.
107,537.—INSIDE SOLE FOR BOOTS AND SHOES.—William E. Prall, Washington, D. C.
107,538.—COVER FOR BOOTS AND SHOES.—William E. Prall, Washington, D. C.
107,539.—WRENCH.—Franklin P. Rand, Pawtucket, R. I.
107,540.—SAFETY VALVE.—William R. Reese, Tremont, Pa., assignor to himself, William Garret, and Michael Moll, same place.
107,541.—MACHINE FOR TEMPERING SICKLE SECTIONS, PLANE-IRONS, &c.—Samuel F. Reynolds, Auburn, N. Y.
107,542.—PRUNING KNIFE.—William Richard, Clyde, Ohio.
107,543.—CARRIAGE WHEEL.—Joseph Ridge, Wayne county, Ind., assignor to Stephen S. Strattan of one-quarter his right.
107,544.—GLASS LAMP.—Daniel C. Ripley, Pittsburgh, Pa,
107,545.—ALLEY BOARD FOR BALL GAME.—Charles Robinson, Boston, Mass.
107,546.—WAGON TONGUE SUPPORT.—Duportal D. Robinson, Niles, Mich.
107,547.—CHECK REIN SUPPORTER.—Andrew H. Rockwell, Harpersville, N. Y.
107,548.—BEE HIVE.—Hiram F. Rohm, West Providence, Pa.
107,549.—ORGAN TREMULANTS.—Thomas Prentiss Sanborn, Boston, Mass.
107,550.—CLASP FOR ELASTIC BAND.—Antoine Scheydecker, Amsterdam, N. Y.
107,551.—COMBINED LANTERN AND CANDLESTICK.—Morrill A. Shepard, Fort Branch, Ind.
107,552.—BURIAL CASE.—George Shilling, Baltimore, Md.
107,553, antedated September 5, 1870.—DESULPHURIZING AUROPYRITES AND OTHER ORES.—Lorenzo Sibert, Staunton, Va.
107,554, antedated September 12, 1870.—SHOVEL FOR SEEDER. David Slaughter, Mountville, Pa.
107,555.—MACHINE FOR DOVETAILING WINDOW SASH.—De Witt C. Smith, Montgomery, Ill.
107,556.—TWINE HOLDER STAND.—James Spencer Smith, Middletown, Conn.
107,557.—BLIND SLAT OPERATOR.—John B. Smith, Samuel A. Greely, and Arthur Champaigne, Chicago, Ill.
107,558.—FLOWER POT.—Charles L. Steele, Boston, Mass.
107,559.—BROOM HANDLE.—Joel Strong, College Hill, Ohio.
107,560.—GANG PLOW BEAM.—James W. Sursa, San Francisco,
107,561.—MACHINE FOR TURNING THE HEADS OF BOLTS.—Wilbur F. Swatuel, Mount Carmel, Conn., assignor to himself and Walter W. Woodruff, same place
107,562.—MACHINE FOR BREAKING HIDES AND WORKING LEATHER. Esau D. Taylor, and William Rude, Hornellsville, N. Y.
107,563.—WIND WHEEL.—Benjamin C. Terry, Key Port, N. Y.
107,564.—TOOL REST.—Alfred Thomas, Worcester, Mass.
107,565.—RASP.—Ira F. Thompson, Providence, R. I.
107,566.—CENTER PLATE FOR STOVE-TOP.—John Thorniley, Fallston, Pa.
107,567.—RATCHET-FEED MECHANISM.—Andrew Turnbull, New Britain, Conn.
107,568. antedated September 12, 1870. — WOOD-BUCKET.—Samuel S. Vail, Keokuk, Iowa.
107,569.—WASHING-MACHINE.—Antoine L. Van Norman, Clinton, La.
107,570.—BUTTON-MACHINE.—Christoph Volkert, New York, N. Y.
107,571.—CAR-COUPLING.—William Walker, Woodside, Cal., assignor to himself and Robert O. Tripp.
107,572, antedated September 5, 1870.—SHOE-FASTENING.—William Powell Ware, New York. N. Y.
107,573.—PROPELLING CANAL-BOAT.—Edward K. Watson, Shokan, N. Y.
107,574, antedated September 17, 1870.—CARD-RACK.—Washington Wendell, Milwaukee, Wis.
107,575.—SASH-HOLDER.—George W. Wheat, Philipsburg, Pa.
107,576.—BRIDGE.—Isaac H. Wheeler, Sciotoville, Ohio.
107,577.—PRUNING-SHEARS.—Frederick A. Will, San Fancisco, Cal.
107,578.—KNOB-LATCH.—John Theophilus Williams, Chicago, Ill.
107,579.—COMPOUND FOR STUFFING AND FINISHING LEATHER.—Theodore Dwight Williams, Chicago, Ill.
107,580.—BEDSTEAD AND TABLE.—George Wilson, Chicago Ill.
107,581.—ADJUSTABLE CHAIR.—George Wilson, Chicago, Ill.
107,582.—BOTTLE-CORKING MACHINE.—Julius Wolff, New York, N. Y., and Wilson N. Numsen, Baltimore, Md.
107,583.—PRINTING-PRESS.—Charles D. Wrightington, Fairhaven, Mass.
107,584.—ADJUSTABLE AWNING.—Louis Yenne, New York, N. Y., and Charles Schneider, Newark, N. J.
107,585.—LOCK FOR PIANOS, &c.—Horrmann Ahrend, Newark, N. J.
107,586.—MAIL-BOX.—Austin W. Allen and Charles Reitz, Indianapolis, Ind.
107,587.—REVERSIBLE KNOB-LATCH.—Henry P. Appleton, Norwich, Conn., assignor to William A. Aiken, same place.
107,588.—BRACELET.—John Barclay, Bergen, N. J.
107,589.—LATCH FOR GATES.—Ephraim Barks and Lucius H. Emmons, Noblesville, Ind.
107,590.—PERMUTATION LOCK.—Joseph E. Barnes, Danvers Centre, and Lucius P. Barnes, Fitchburg, Mass.
107,591.—WASH-BOILER.—Joseph W. Bates and Mary Ann Bates, St. Paul, Minn.
107,592.—MEAT AND VEGETABLE-CUTTER.—Paul Bonfils and John Grossmann, West Hoboken, N. J.
107, 593.—SAW.—William E. Brooke, Trenton, N. J.
107,594.—HAND CORN-PLANTER.—George Burson, East Palestine Ohio.
107,595.—HAND CORN-PLANTER.—George Burson, East Palestine Ohio.
107,596.—DEVICE FOR CURLING AND DRESSING HAIR.—P. Ceredo, Düsseldorf, Prussia, assignor to himself and Thomas Ferguson Miller.
107,697.—BASE-BUTNING COAL-STOVE.—Albert C. Corse, New York, N. Y.
107,598.—FRUIT-JAR.—Edward Croft, Philadelphia, Pa., assignor to himself and Henry Conlter, same place.
107,599.—COMBINED FURNACE OR OVEN AND TEMPERING-DIE.—Henry Disston, Philadelphia, Pa.
107,600, antedated September 19, 1870.—APPARATUS FOR ROASTING AND DRYING ORES ANE OTHER MATERIALS.—Alfred Duvall, Baltimore, Md.
107,601.—ELECTRO-MAGNETIC RAILROAD SIGNAL APPARATUS.—Alexander J. Elder, Chicago, Ill.
107,602.—ART OF MANUFACTURING SPIKES.—David Eynon, Richmond, Va., assignor to the Tredegar Company, same place.
107,603.—EXHAUST-NOZZLE.—A. Faber Du Faur, New York, N. Y.
107,604.—WASHING-MACHINE.—Joseph A. Fletcher, Eyota, Minn.
107,605.—EXHAUST-NOZZLE FOR STEAM-ENGINE.—William A. Foster, Fitchburg, Mass.
107,606.—PLOW.—Francis M. Franklin, Springfield, Ohio, assignor to himself and Asahel Franklin, same place.
107,607.—LIQUID-METER.—William Henry Fruen, Boston Mass.
107,608.—PROTECTING DIKES AND EMBANKMENTS AGAINST THE RAVAGES OF ANIMALS, &c.—Smith and Gardner, New York, N. Y., assignor to himself and Hiram Howe, same place.
107,609.—NUT-LOCK.—Robert Gilliland, Hudson, Mich.
107,610.—MACHINE FOR DRILLING AND CUTTING SCREW-THREADS.—John James Grant, Greenfield, Mass., assignor to himself and Luther C. Pratt, same place.
107,611.—CHUTE FOR DELIVERING TIMBER.—James W. Haines, Genoa, Nevada.
107,612.—KILN.—Benjamin R. Hawley, Normal, Ill.
107,613.—MACHINE FOR WELDING CHAIN-LINKS.—William B. Hayden, Columbus, Ohio.
107,614.—FASTENING FOR EPAULET.—Edward Julius Helwig, Philadelphia, Pa., assignor to R. M. Robinson & Co., same place.
107,615.—DEVICE FOR MOVING BUILDING.—Stephin Inman, Rockford, Ill.
107,616.—DOOR-SPRING.—Melvin Jincks, Wallace, N. Y.
107,617.—LAMP WICK REGULATOR.—Lemuel W. Leary, Norfolk, Va.
107,618.—BED-RAIL FASTENER.—John Leman, Cincinnati, Ohio.
107,619.—COMPOUND TREADLE.—Orwell H. Needham, New York, N. Y.
107,620.—PRESERVING AND HARDENING WOOD.—Benjamin R. Nickerson, San Francisco, Cal.
107,621.—APPARATUS FOR MIXING, HEATING, AND COOLING SUBSTANCES.—Melchior Nolden, Frankfort-on-the-Main, Prussia.
107,622.—HOOP-SHAVING MACHINE.—Stillman Parker, Altoona, Pa.
107,623.—APPARATUS FOR COUPLING CARS.—Richard F. Randolph, Jr., East Palestine, Ohio.
107,624.—WATER-WHEEL CASE.—James Raney, Newcastle, Pa.
107,625.—MACHINERY FOR DRESSING SKINS.—Herbert P. Reed and Thomas E. Wilson, Peabody, Mass.
107,626.—ELECTRO-MAGNETIC APPARATUS FOR MEDICAL USE.—Charles Reitz, Indianapolis, Ind.
107,627.—WATER-WHEEL.—Theodore H. Risdon, Mount Holly, N. J.
107,628.—BEE-HIVE.—Hiram F. Rohm, West Providence, Pa.
107,629.—BASE-BURNING COOKING-STOVE.—Thomas P. Rossiter, Cold Spring, N. Y.
107,630.—DERRICK-BOAT.—Thomas Saulpaugh, Rock Island, Ill.
107,631.—CAR-AXLE LUBRICATOR—Thomas Sayles, Chicago, Ill.
107,632.—GRASS-CUTTER.—Samuel W. Sears, New York, N. Y.
107,633.—PORTABLE SPRINKLING PUMP.—William Servant, Providence, R. I., assignor to himself and Josiah A. Whitman, same place.
107,634.—FASTENING FOR NECK-TIES.—Peter J. Shirts, Highland Falls, N. Y.
107,635.—ROTARY AIR-WHEEL FOR GAS-CARBURETERS.—James F. Spence, Brooklyn, N. Y., and Lovias D. Towsley, Newark, N. J.

107,636.—SLIDE FOR EXTENSION TABLES.—Stephen Stilwell, Waterloo, N. Y.

107,637.—METHOD OF SETTING POSTS.—Uriah B. Stribling, Madison, Ind.

107,638.—GATE.—John J. Tofflemire and Joseph D. Linnell, Rockford, Ill.

107,639.—ROTARY-POWER PLOW.—James Tranter, Joseph Kinsey, and John M. Carr, Cincinnatti, Ohio.

107,640.—GRINDING-MILL.—Amos Verbeck, Sterling, Ill.

107,641.—ROUNDING-UP MACHINE FOR SHOES.—Henry S. Vrooman, Boston, Mass.

107,642.—FABRIC FOR THE MANUFACTURE NF SHOES, &c.—Enoch Waite, Franklin, Mass.

107,643.—RAILWAY.—Charles H. White, Emmett township, Mich.

107,644.—MACHINE FOR HULLING AND SCOUNING GRAIN, RICE, COFFEE, &c.—Levi H. Whitney, Washington, D. C.

107,645.—RECTIFYING AND IMPROVING ALCOHOLIC SPIRITS.—Daniel Worthen, Brooklyn, N. Y.

REISSUES.

4,124.—Division A.—HARVESTER.—Rufus Dutton, Yonkers N. Y.—Patent No. 31,378, dated February 12, 1861.

4,125.—Division B.—HARVESTER.—Rufus Dutton, Yonkers, N. Y.—Patent No. 31,378, dated February 12, 1861.

4,126.—REVERSIBLE KNOB-LATCH.—Henry H. Elwell, South Norwalk, assignor, through mesne assignments, to the Russell and Erwin Manufacturing Company, New Britain, Conn.—Patent No, 53,562, dated March 27, 1866.

4,127.—POLISHING-MACHINE.—Peter F. Randolph, Jerseyville, Ill.—Patent No. 95,265, dated September 28, 1869.

4,128.—HORSE HAY-RAKE.—Joseph H. Shireman, York, Pa., assignee of George S. Reynolds.—Patent No. 23,943, dated May 10, 1859.

DESIGNS.

4,357.—BOX FOR TOP OF BUREAUS.—Cheney Kilburn, Philadelphia, Pa., assignor to Kilburn & Gates, same place.

4,358.—SHAWL FABRIC.—Martin Landenberger, Philadelphia, Pa.

4,359.—BERRY-BOX.—John W. Leslie, South Pass, Ill.

4,360.—STOVE-PLATE.—Nicholas S. Vedder, Troy, and Tobias S. Heister, Lansingburg, N. Y., assignors to Nicholas S. Vedder.

EXTENSIONS.

EDWARD PARKER, of Plymouth, Conn.—Letters Patent No. 15,666 dated September 2, 1856.—Improved Buckle for Wearing Apparel.

HENRY VOELTER, of Heidenhein, Kingdom of Würtemburg, Germany.—Letters Patent No. 21,161, dated August 10, 1858; antedated August 29, 1856; reissue No. 3,361, dated April 6, 1869.—Improvement in Reducing Wood-Fibers to Paper Pulp.

RICHRD H. GARRIGUES, of Salem, Ohio, administrator of L. A. Dole, deceased. Letters Patent No. 15,718, dated September 9, 1856.—Improvement Saw-Gummer.

GEORGE JOHNSON, of Marshall, Mich., administrator of Joseph D. Cawood, deceased.—Letters Patent No. 15,687, dated September 9, 1856.—Improvement in Repairing Railway Bars.

MICHAEL H. SIMPSON, of Boston, Mass.—Letters Patent No. 16, 864, dated March 17, 1857; antedated September 17, 1856.—Improvement in Machinery for Combing Wool.

Improved Kiln for Burning Drain Tile.

MR. JOHN HORNBY, of Perth Amboy, N. J., has recently obtained Letters Patent through the agency of WESTERN AND COMPANY, for improvements in kilns for burning drain tile, which is likely to supersede the old plan. The peculiar features of this invention are simplicity, cheapness in its construction, and great economy in fuel. The nature of this invention consists—first, in constructing and arranging the chimney, or principal flue, directly into the centre of the kiln, into which are directed a suitable number of other flues, so as to distribute the heat evenly throughout the mass of moulded clay that is designed to be subjected to the action of the heat. It again consists in making the kiln a circular form, and conducting the heat to the top of the mass of moulded clay, and by the peculiar and novel construction of the flues, the heat is drawn down through the mass equally on all sides, so that every piece of clay in the mass is equally subjected to its action, by which means the whole is burnt evenly, and in the most perfect manner.

A New Staking Tool for Jewellers.

LETTERS PATENT have recently been granted to Mr. O. M. BISSELL, of Shelburne Falls, Mass., for a new and improved staking tool for jewellers. The want of a tool of this kind has long been felt by the trade. It is composed of a solid block of hard metal, rectangular in form, with a deep groove running longitudinally through the centre, immediately over which is placed a hardened steel plate, provided with graduated holes of suitable sizes to receive the work to be done. There is a movable curved arm attached to the side of the main block, which extends upwards and over the steel plate; in this arm is provided a perpendicular hole, that comes directly over the hole in the steel plate, in which the different tools are placed when designed to operate upon the work.

This patent was secured through the agency of WESTERN AND COMPANY.

Extinction of Fire by Gas.

WE have for years maintained that this is the only effective and economical way of quenching our public conflagrations and saving to our insurance companies $30,000,000 per annum. Not half the mischief of the fire is occasioned by the flames, but by the clumsy manner in which they are assailed by the water pumpers, who within the last few years have called steam to their aid, and thus double their means of destruction. We trust that the present designs will be immediately carried out in Brooklyn, and that so small a capital as that required ($250,000) will be greatly contributed by the fire insurance companies. The following is the purport of the scheme:

The company proposes to build, in some central location, a reservoir similar to the gasometer of a gas-house, of sufficient capacity for all emergencies, and run a four-inch pipe therefrom in every direction through the streets, having in front of every door a valve, to which a small rubber hose can be easily attached, by which the stream of gas can be directed to any room on fire. To furnish such a reservoir, with its necessary retorts for making gas, and laying two hundred miles of pipe through the city, will come within a cost of $250,000, and the company claims that the saving of property which water destroys and gas leaves untouched, would more than pay the entire cost in one year, to say nothing of the saving of the buildings. There can be no doubt but that the full damages by fire annually, in the United States, exceed $50,000,000, most of which is destroyed under the play of the steam fire engines. Of this amount at least one-half is owing to the destruction of goods, which might have been saved had some other agency than water been used as an extinguisher.

From the reservoir, through the pipes, carbonic acid gas will be forced to the endangered building. Carbonic acid gas and its properties were discussed about the middle of the last century, by Dr. JOSEPH BLACK, a Scotch chemist of Edinburgh, who termed it "fixed air," because it was imprisoned in rock until the touch of fire or acid set it free. It is certainly very strange that carbonic acid gas, composed as it is of two parts of oxygen and one part of carbon, should extinguish fire, when oxygen is the agent of combustion. But so it is. Repeated experiments have shown that fire cannot burn in an atmosphere containing one-fifth part of its volnme of this gas, and that its presence does not injure the finest fabrics, or discolor the most highly polished plate; consequently it does no damage to goods or furniture, which water destroys. It can be manufactured at so low a price that the flames of a moderate-sized building on fire could be extinguished for a few dollars. Its use has been frequently endorsed by insurance companies.

Up to the present time the difficulty in making use of carbonic acid gas for extinguishing fires, has been found in the production and application of this gas in sufficient quantities for obtaining a practical advantage at a real fire. Experimentally the presence of this gas in quantity proportionate to a flame has been found to insure its sudden and complete extinction; but until within the last few months no plan has been put in operation to make this power available. By the new method the gas may be easily generated in any quantity desired, and by the use of certain chemicals, after the gas is evolved, the resultant product is an article of merchandise for which there is an unlimited demand at a price which not only leaves the gas free of cost, but affords a handsome profit in the manufacture.

In 1851 a coal mine in England, that had been on fire for thirty years, and had extended over twenty-six acres, was completely extinguished by injecting only 8,000,000 cubic feet of carbonic acid gas. Water and chemical solutions had been tried in every way and quantity for years upon these burning acres of coal, without any perceptible effect, for the intense heat would drive them back as a volcano sends out its lava into the heavens.

The loss by water, caused by the engines playing after a fire is out, or nearly so, is very great. Once in operation, a steam fire engine is frequently as destructive as the conflagration itself. If the new method succeeds and is generally adopted, the calamities and losses that are yearly chronicled, owing to a short supply or frozen hydrants, will have ceased. As the pipes will be immediately laid and a reservoir built, it is expected that very soon the new apparatus and plan will be practically tested. Until then curiosity must remain unsatisfied.—*New York Insurance Journal.*

Gold in New Zealand.—As an illustration of the extraordinary richness of some of the quartz in New Zealand (says a Northern paper), we may mention that a few days ago, at the melting-houses of the Union Bank, 30 oz. of gold were obtained from 107 oz. of picked stone from a Coromandel reef. At this rate, a ton avoirdupois would yield 9,158 oz. troy of gold, worth £25,000 sterling. The process employed was that of fusing at a high temperature the entire mass with a flux that converted the silica into a fluid glass, through which the gold sank to the bottom of the crucible by reason of its greater specific gravity.—*New Zealand Examiner.*

Preparation of Oxygen Gas.—ROBBINS' method for the preparation of oxygen gas without the aid of heat has been modified by BOTTGER, and is represented as affording a pure gas as readily as hydrogen can be made from zinc and dilute sulphuric acid. He takes equal weights of peroxide of lead and binoxide of barium, in a tubulated retort or flask, provided with a safety tube, and pours on weak nitric acid; the evolution of oxygen takes place regularly, and the reaction is explained as follows: Binoxide of hydrogen is first formed, and this is at once decomposed by the peroxide of lead, and pure oxygen is liberated. The mixture of the dry lead and barium salt will keep in a well-stoppered bottle, and thus the necessary reagents for the evolution of oxygen can be always on hand.

Iodine from Chili Saltpetre.—Professor WAGNER, in his reports, says that the manufacture of iodine from Chili saltpetre already amounts to 30,000 lb. per annum. The method invented by THIERCELIN for its reclamation from the crude material is as follows: The mother liquors resulting from the manufacture of saltpetre are treated with a mixture of sulphurous acid and sulphite of soda, in proper proportion, and the iodine will be precipitated as a black powder. The precipitated iodine is put into earthern jars, on the bottom of which are layers of quartz sand, fine at the top and coarse at the bottom; from this it is removed by earthern spoons into boxes lined with gypsum, and a greater part of the water thus removed. It is sometimes sold in this impure state, or further purified by sublimation.

The Iron Mines of Russia.—The declension of iron manufacture in Russia arises chiefly from deficiency of fuel, and the great distance of the mines from the centres of commerce and civilization. The iron industry in Russia owed its origin to PETER the Great, and 150 years ago vast mines were wrought and great works erected. The empire seems to produce every description of ore, and each in great variety. In the Altai and the Oural vast masses of magnetic ore are found. There are various other directions where magnetic ore is found in smaller deposits. Very fine ore for the purpose of steel manufacture is extracted in several districts. Ordinary ores are much more abundant, and are discovered over a wider area of country. In the centre of Russia red oxide is the prevailing yield. One great advantage is that a deep iron mine is not known in Russia; whenever the metal is found it is near the surface. It would be impossible to estimate the resources of this country in iron; probably it exceeds that of any other country in the world.

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf

IMPORTANT TO INVENTORS.

WESTERN AND CO.'S PATENT AGENCY.

CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

We have engaged as solicitor and manager Mr. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

We are fully prepared to prosecute Rejected Cases and Cases in Interference and Infringements, and also to procure Reissues and Extensions of Patents.

We can also furnish Models for use in the Patent Office, to parties who may desire it, as we have made arrangements for this purpose with one of the most skilful machinists in this country, who possesses every facility for getting up models in the most perfect manner, at short notice, and on reasonable terms.

We shall give special attention to the prosecution of Rejected Applications, which have been improperly prepared by the inventor or incompetent attorneys.

We shall be ready at all times to furnish all necessary information and advice to intending applicants, and give our opinion as to the patentability of their inventions, free of charge; and we make it a rule never to take charge of a case unless we see a reasonable probability of obtaining a patent without first giving the inventor our candid opinion as to the probable result of the application.

OUR CHARGES.

Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

The cost of getting out a patent through our agency is—

For first Government fee, stamp, etc	$16
" our fee	$30 to 40
" final Government fee	20
Total	$66 to $76

If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

For Rejected Applications prepared by others, our charges vary somewhat according to the nature of the case, but are generally as follows:

In advance, on receiving the case	$10
When the patent is allowed	$20 to 30
Total	$30 to $40

the applicant paying such Government fees as may be required.

For preparing and filling a Caveat,

Our fee is	$15
Government fee	10
Total	$25

For attending to the obtaining of Releases, Extensions, etc. and preparing Assignments, our charges vary according to the labor involved.

We are possessed of all the facilities for the successful prosecution of applications for patents in Great Britain, France, Belgium, and other foreign countries, on favorable terms.

Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 to $40, being payable as soon as the application is ready to be sent to Washington.

Patents granted through this agency will be described and illustrated in the columns of the ENGINEERING AND MINING JOURNAL or the MANUFACTURER AND BUILDER, without further charge to the inventor than the cost of the necessary cuts.

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The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country and presents the very best means of reaching that very important class of men.*

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MISCELLANEOUS.

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N.B.—TILLOTSON & CO., 8 Dey street, New York, and BLISS, TILLOTSON & CO., 247 South Water street, Chicago, are General Agents for the sale of any Telegraph and Electric Goods made by me, at Factory prices.

JOHN THORNLEY, 503 Chestnut street, Philadelphia, Pa., is Agent for the sale of any goods made by me at Factory prices.

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☞ Any goods of manufacture, "excepting Telegraph and Electric Goods," are for sale in New York, by H. G. NORTON & CO., 26 Park Place; RUBBER CLOTHING CO., 347 Broadway; A. D. & C. A. HODGMAN, 201 Broadway, N. Y. sept13:4m

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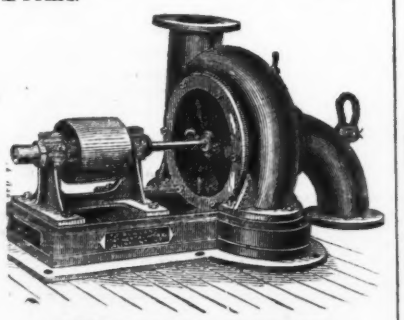

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MANUFACTURED SOLELY BY
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Greenpoint, Brooklyn, N. Y.
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MISCELLANEOUS.

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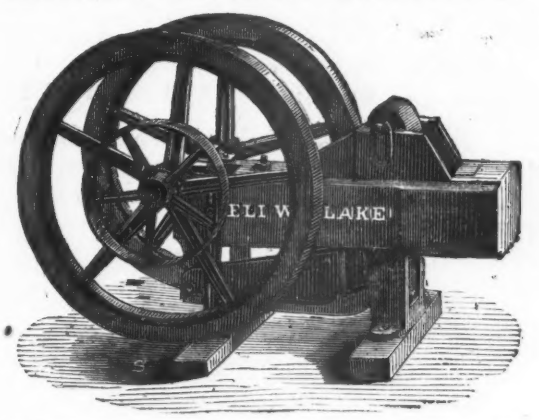

The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

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May 17:1y

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May 24:1y

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Jun28:1y

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STEAM PUMPS,

HAND PUMP AND STEAM ENGINE

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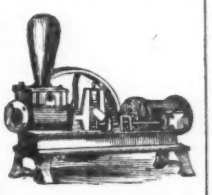

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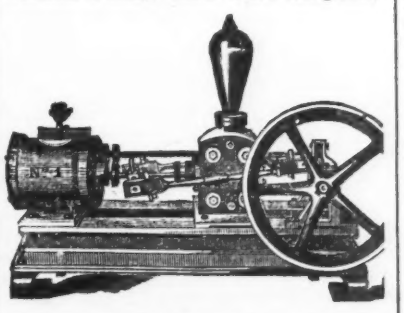

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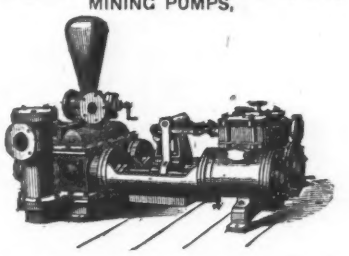
MINING PUMPS,



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Extensively used for Smelting Iron.

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This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs., of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

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" Quantity of, produced by the furnace.
" Friction of
" The great friction of produced by one mode of ventilation, and how reduced by another
" Pure added to impure (plans.
" Splitting of (plans)
" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Velocity and force
" Rush of, into each division
" Quantity produced by natura ventilation
" Splitting, why it should be adopted
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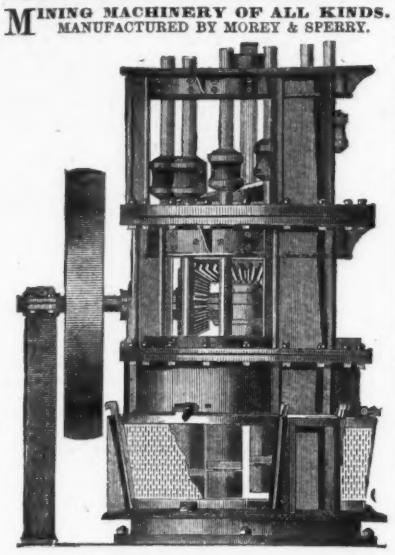

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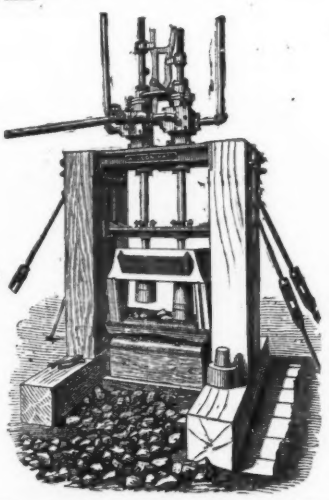

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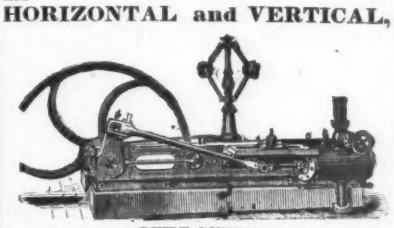

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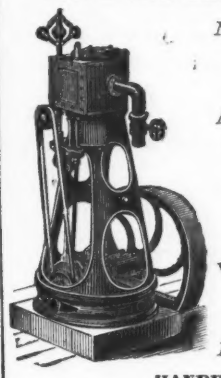

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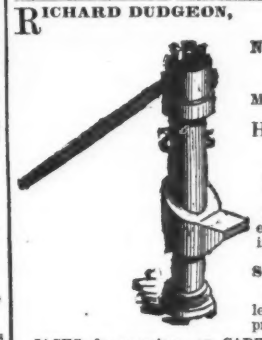

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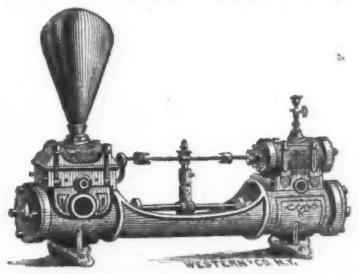

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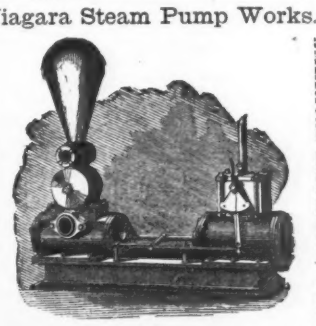

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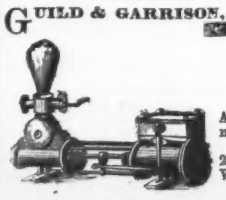

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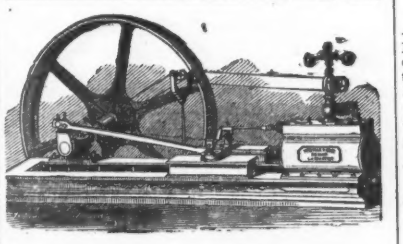

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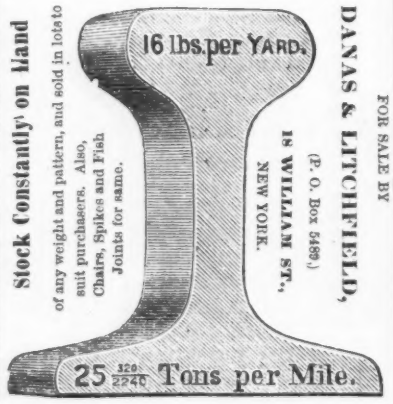
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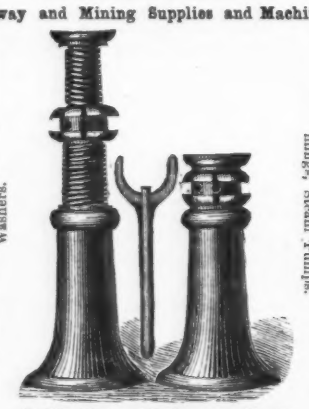

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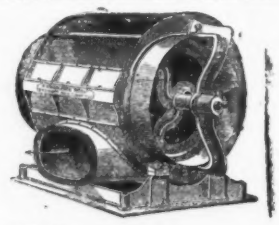

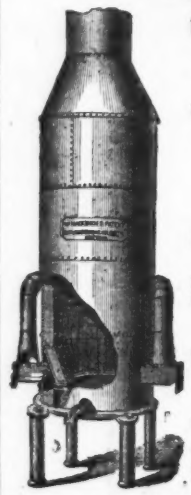

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